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PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS

VOL. XLIV—No. 2

February, 1918

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PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS

(INSTITUTED 1852)

VOL. XLIV—No. 2

FEBRUARY, 1918

Edited by the Secretary, under the direction of the Committee on Publications.

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NEW YORK 1918

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ON ENGINEERING EDUCATION: Desmond FitzGerald, Onward Bates, D. W. Mead.

TO CODIFY PRESENT PRACTICE ON THE BEARING VALUE OF SOILS FOR FOUNDATIONS, ETC.: Robert A. Cummings, Edwin Duryea, E. G. Haines, Allen Hazen, James C. Meem, Walter J. Douglas.

ON THE REGULATION OF WATER RIGHTS: F. H. Newell, W. C. Hoad, John H. Lewis.

TO REPORT ON STRESSES IN RAILROAD TRACK: A. N. Talbot, A. S. Baldwin, G. H. Bremner, John Brunner, W. J. Burton, Charles S. Churchill, W. C. Cushing, Robert W. Hunt, George W. Kittredge, Paul M. LaBach, C. G. E. Larsson, G. J. Ray, Albert F. Reichmann, H. R. Safford, F. E. Turneaure, J. E. Willoughby.

The Reading Room of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

HEADQUARTERS OF THE SOCIETY—33 WEST THIRTY-NINTH STREET, NEW YORK.

TELEPHONE NUMBER.....4600 Vanderbilt.
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AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed in its publications.

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MINUTES OF MEETINGS OF THE SOCIETY

SIXTY-FIFTH ANNUAL MEETING*

January 16th, 1918.—The meeting was called to order at 10 A. M., in the Auditorium of the Engineering Societies Building; President George H. Pegram in the chair; Chas. Warren Hunt, Secretary; and present, also, about 650 members.

The President announced that he had appointed Messrs. Robert Ridgway, Thurston C. Culyer, Frederick W. Gardiner, Alexander Haring, C. V. V. Powers, James F. Sanborn, and Silas H. Woodard as Tellers to canvass the Ballot for Officers for the ensuing year.

The President delivered the Annual Address.†

* A full report of the Sixty-fifth Annual Meeting is printed on pages 110 to 142 of this number of *Proceedings*.

† See page 359 of Papers and Discussions.

The Annual Report of the Board of Direction, and the Annual Reports of the Secretary and of the Treasurer,* for the year ending December 31st, 1917, were presented and accepted.

The Secretary read the report of the Committee to Recommend the Award of Prizes,† and announced that the medals and prizes for the year ending July, 1917, had been awarded by the Board of Direction in conformity with that report, as follows:

THE NORMAN MEDAL to Paper No. 1366, "Chemi-Hydrometry and Its Application to the Precise Testing of Hydro-Electric Generators", by Benjamin F. Groat, M. Am. Soc. C. E.

THE J. JAMES R. CROES MEDAL to Paper No. 1370, "The Effects of Straining Structural Steel and Wrought Iron", by Henry S. Prichard, M. Am. Soc. C. E.

THE THOMAS FITCH ROWLAND PRIZE to Paper No. 1359, "The Astoria Tunnel Under the East River for Gas Distribution in New York City", by John Vipond Davies, M. Am. Soc. C. E.

THE JAMES LAURIE PRIZE to Paper No. 1354, "Pearl Harbor Dry Dock", by H. R. Stanford, M. Am. Soc. C. E.

THE COLLINGWOOD PRIZE FOR JUNIORS to Paper No. 1362, "The Cherry Street Bridge, Toledo, Ohio", by Clement E. Chase, Jun. Am. Soc. C. E.

The Secretary presented the report of the Tellers appointed by the Board of Direction to canvass the final suggestions for members of the Nominating Committee, to represent certain districts, and the following were appointed to serve for two years:

Charles E. Trout	Representing	District	No.	1
Clarence Blakeslee	"	"	"	2
Robert Farnham	"	"	"	4
John H. Darling	"	"	"	7
Charles A. Morse	"	"	"	8
Charles E. Johnston	"	"	"	9
Joseph Jacobs	"	"	"	12

Desmond FitzGerald, Past-President, Am. Soc. C. E., Chairman of the Special Committee on Engineering Education, reported progress, and Professor C. R. Mann addressed the meeting on that subject.

Robert A. Cummings, M. Am. Soc. C. E., Chairman of the Special Committee to Codify Present Practice on the Bearing Value of Soils for Foundations, reported progress.

A. N. Talbot, M. Am. Soc. C. E., Chairman of the Special Committee to Report on Stresses in Railroad Track, presented a Progress Report of that Committee.‡

* For these reports see pages 24 to 39 of *Proceedings* for January, 1918 (Vol. XLIV).

† See page 110.

‡ Printed on pages 55 to 247 of Papers and Discussions in *Proceedings* for January, 1918.

On motion, duly seconded, the report was received and ordered printed in *Proceedings* and *Transactions,* and the Committee continued.

George W. Tillson, M. Am. Soc. C. E., on behalf of W. W. Crosby, M. Am. Soc. C. E., Chairman of the Special Committee on Materials for Road Construction and Standards for Their Test and Use, presented the Final Report of that Committee.*

On motion, duly seconded, the report was accepted and the Committee discharged with thanks.

Lewis D. Rights, M. Am. Soc. C. E., Chairman of the Special Committee on Steel Columns and Struts, presented the Final Report of that Committee.†

On motion, duly seconded, the report was received, and the Committee was discharged with thanks; it being understood that discussions on any of the reports of Special Committees would be received and printed in *Proceedings* and that such discussions would be answered by members of those Committees if considered desirable.

The Secretary announced that he had received discussions on the Report of the Special Committee on Steel Columns and Struts from Messrs. Gustav Lindenthal and Henry S. Prichard.

On motion, duly seconded, it was ordered that these discussions be not read, but be published in *Proceedings.*

A Progress Report of the Special Committee on the Regulation of Water Rights‡ was received and accepted as printed.

In the matter of the proposed revision of the Constitution,§ Nelson P. Lewis, M. Am. Soc. C. E., addressed the meeting and offered the following resolutions:

Whereas, the proposed revision of the Constitution of the Society, while containing many desirable changes, includes provisions which would define more narrowly the experience required for eligibility to the grade of Member; would vest in the Board of Direction full control over procedure relating to discipline under by-laws which may be adopted by the said Board and changed at its pleasure; would confer upon an Executive Committee of six (6) all the powers of the Board when the said Board is not in session, with the sole requirement that the other members of the Board shall be advised of its action; and would effect changes which have recently been submitted to the membership and rejected by a decisive vote; and

Whereas, it appears that the opinion of the members of the Board of Direction was greatly divided as to some of the changes; and

Whereas, the sections of the present Constitution relative to amendments only permit changes "pertinent to the original amendment" or

* Printed on pages 2327 to 2408 of Papers and Discussions in *Proceedings* for December, 1917.

† Printed on pages 2409 to 2459 of Papers and Discussions in *Proceedings* for December, 1917.

‡ Printed on pages 2461 to 2464 of Papers and Discussions in *Proceedings* for December, 1917.

§ See *Proceedings* for May, 1917, p. 315.

reference to a committee for further consideration, which committee must report at the next general meeting, after which the amendment must go to letter-ballot; therefore, be it

Resolved, that the proposed revision of the Constitution be ordered to letter-ballot with the statement that, in view of the objections above indicated, it is the sense of this meeting that it should not be adopted; and be it further

Resolved, that a copy of this preamble and resolution be sent to each corporate member with the form of ballot for voting upon the proposed revision.

These resolutions were seconded by Gardner S. Williams, M. Am. Soc. C. E., and adopted as the action of the meeting.

Robert Ridgway, M. Am. Soc. C. E., presented the report of the Tellers appointed to canvass the Ballot for Officers for the ensuing year.

The President announced the election of the following officers:

President, to serve one year:

ARTHUR N. TALBOT, Urbana, Ill.

Vice-Presidents, to serve two years:

JOHN F. COLEMAN, New Orleans, La.
NELSON P. LEWIS, New York City.

Treasurer, to serve one year:

GEORGE W. TILLSON, Brooklyn, N. Y.

Directors, to serve three years:

GEORGE W. GOETHALS, New York City.
ANDREW M. HUNT, New York City.
SAMUEL T. WAGNER, Philadelphia, Pa.
EDWARD E. WALL, St. Louis, Mo.
MILO S. KETCHUM, Boulder, Colo.
HARRY HAWGOOD, Los Angeles, Cal.

Desmond FitzGerald and Frederic P. Stearns, Past-Presidents, Am. Soc. C. E., conducted Mr. Talbot to the chair.

Mr. Talbot addressed the meeting briefly.

Adjourned.

February 6th, 1918.—The meeting was called to order at 8.30 P. M.; Vice-President George W. Kittredge in the chair; Chas. Warren Hunt, Secretary; and present, also, 127 members and 14 guests.

The minutes of the meetings of December 19th, 1917, and January 2d, 1918, were approved as printed in *Proceedings* for January, 1918.

A paper by F. W. Gardiner and S. Johannesson, Members, Am. Soc. C. E., entitled "Manhattan Elevated Railway Improvements", was presented by the authors and illustrated with lantern slides.

The paper was discussed by Messrs. T. Kennard Thomson, George H. Pegram, Edward Wegmann, H. Constable, C. E. Carpenter, and F. W. Gardiner.

The Secretary announced the following elections on January 14th, 1918:

As Members

Frank Harrison Bailey, Nenana, Alaska
Ossian Elmer Carr, Niagara Falls, N. Y.
Ralph Dominguez, Buenos Aires, Argentine Republic
John Thomas Keenan, Edgewood, R. I.
William Schurman Lea, Montreal, Que., Canada
Arthur Wood Neel, New York City
Lionel Rene Viterbo, St. Louis, Mo.
Ernest Hardwick Wilcox, Los Angeles, Cal.

As Associate Members

Alexander Alexander, Troy, N. Y.
Edward Taber Almy, Jr., Kansas City, Kans.
Roy Frederic Bessey, Washington, D. C.
Edwin Wallace Borough, Trenton Falls, N. Y.
Ralph Bosard, Memphis, Tenn.
Richard Ludwig Brandt, San Antonio, Tex.
Warren Henderson Buchanan, Gulfport, Miss.
John Schroder Carpenter, Springfield, Ohio
Arthur Grover Cleveland Chapman, Providence, R. I.
William Claney Edgar, Jersey City, N. J.
Glenn Perkins Edwards, Poughkeepsie, N. Y.
Laurence Emerson Frissell, New York City
Harry Parker Hammond, New York City
John McRae Hartgering, Detroit, Mich.
Marshall Howard, Council Bluffs, Iowa.
Theodore Human, Jr., Cayo Mambi, Oriente, Cuba
Emil Federic Jacobi, Bayonne, N. J.
Leslie Ingalls Johnstone, Winnipeg, Man., Canada
John Martin Kemmerer, Chicago, Ill.
Peter Magnus Larsen, Chicago, Ill.
Albert Mortimer McPherson, Milford, Utah
William Montgomery Mitchell, Flint, Mich.
John Edward Openshaw, Montreal, Que., Canada
Herbert Gregor Outwater, New York City
Rennick Rubenell Paine, Evanston, Wyo.
Benjamin Gilbert Pasco, Center, Miss.
Ashton Ramsay Peyton, Denver, Colo.
Earle Russell, Berkeley, Cal.

William Japhia Schlick, Ames, Iowa
William Frank Stanton, Valparaiso, Chile
David Field Stockbridge, Oklahoma, Okla.
Gaither Hunter Sykes, Ellicott City, Md.
James Sykes, Denver, Colo.
Walter Charles Voss, Brookline, Mass.
Henry Lewis Wheeler, Auberry, Cal.
Frank Osmond White, New York City
Merton Horatio Willis, Tampico, Mexico
Maurice Mayer Wyckoff, Boston, Mass.

As Juniors

Edwin Leo Ball, Pineville, La.
Frederick Martin Cleckner, Erie, Pa.
Clinton Stowell Darling, South Vernon, Mass.
Enrique Diaz, Rugby, England
Percival Elliott, Roanoke, Va.
Albert Hartwell Jewell, Lansing, Mich.
Charles Raymond Larkin, Philadelphia, Pa.
Arthur Branch McGee, Pasadena, Cal.
John Owings Preston, Rochester, N. Y.

The Secretary announced the following transfers on January 14th, 1918:

From Associate Member to Member

Dudley Frank Black, Denver, Colo.
Clifton Ewing Hickok, Alameda, Cal.
George Henry Knutson, Jackson, Mich.
Walter Frederick Reichardt, Camp Beauregard, La.
Henri Rusch, St. Louis, Mo.
William Day Shannon, Youngstown, Ohio
Ezra Collin Shoecraft, Flint, Mich.
Russell Biddle Smith, New York City
Edward Smulski, New York City
Alfred Howe Terry, Fairfield, Conn.
Warren Bertram Travell, New York City
Needham Everett Waddell, Kansas City, Mo.
Frank Johnson Trelease, New Orleans, La.

From Junior to Associate Member

Clarence Reed Carter, Devine, Tex.
Ivan Charles Crawford, Greden, Colo.
Samuel Cellner Dreyfus, Columbia, S. C.
Lewis Alden Estes, Boston, Mass.

George Inness Gay, London, England
John Robert Haswell, Washington, D. C.
Roland Ellis Hutchins, Memphis, Tenn.
Frank Melvin S. Johnson, Vancouver, Wash.
William Bruce McMillan, San Jose, Cal.
Jared Leroy Mathias, Descanso, Cal.
Donald Curtis May, Ann Arbor, Mich.
John Owen Miller, San Francisco, Cal.
Louis Watters Payne, Chuquicamata, Chile
Ruble Isaac Poole, West Raleigh, N. C.
Alexander Crawford Smith, Jr., Baltimore, Md.

From Junior to Associate

Walter Ferrell Winton, Fort Sill, Okla.

The Secretary announced the following deaths:

William Bradford, of Pittsburgh, Pa., elected Member, December 7th, 1898; died November 23d, 1917.

Thomas Francis Curran, of Utica, N. Y., elected Associate Member, August 31st, 1915; died January 8th, 1918.

William Hague, of New York City, elected Associate Member, October 4th, 1910; died January 1st, 1918.

Jay Cassius Canney, of Gary, Ind., elected Junior, May 31st, 1916; died September 15th, 1917.

Adjourned.

REPORT IN FULL OF THE SIXTY-FIFTH ANNUAL MEETING, JANUARY 16TH AND 17TH, 1918.

Wednesday, January 16th, 1918 (10 A. M.).—The Sixty-fifth Annual Meeting was called to order in the Auditorium of the Engineering Societies Building, 39 West 39th Street, New York City; President George H. Pegram in the chair; Chas. Warren Hunt, Secretary; and present, also, about 650 members.

THE PRESIDENT.—The meeting will please come to order. I shall appoint as Tellers, to canvass the Ballots for Officers, Messrs. Robert Ridgway, Thurston C. Culyer, Frederick W. Gardiner, Alexander Haring, C. V. V. Powers, James F. Sanborn, and Silas H. Woodard.

The first order of business, I believe, is the President's Annual Address.

(The President delivered the Annual Address.*)

THE PRESIDENT.—The next business is the report of the Board of Direction, which the Secretary will please read.

The Secretary presented the report of the Board of Direction.†

In reading that part of the Annual Report relating to the Roll of Honor, which in the *Proceedings* for November, 1917, contained the names of 575 officers, in the December *Proceedings,* 743 names, and 929 names on December 31st, 1917, the Secretary called attention to the Service Flag, hanging in the Auditorium, and containing 953 stars, and stated that at the present time the number would be nearly 1 000.

THE PRESIDENT.—That completes the report of the Board of Direction. If there is no objection it will be adopted as read. The report of the Secretary to the Board of Direction.

The Secretary read his report.‡

With this report there is a balance sheet, certified by a firm of public accountants, which I hardly think need be read.

The Secretary read the Treasurer's report.§

THE PRESIDENT.—If there is no objection, these reports will be accepted as printed.

Mr. Secretary, have you the Report of the Committee to Recommend the Award of Prizes?

THE SECRETARY.—Yes, sir; I have that report. It is as follows:

"DECEMBER 24, 1917.

"THE BOARD OF DIRECTION,
American Society of Civil Engineers,
33 West 39th St., New York City.

"GENTLEMEN: Your committee, appointed to 'Recommend the Award of Medals and Prizes for this year,' submits herewith the result

* See p. 359 of Papers and Discussions.
† See *Proceedings,* Am. Soc. C. E., Vol. XLIV, p. 24 (January, 1918).
‡ See *Proceedings,* Am. Soc. C. E., Vol. XLIV, p. 36 (January, 1918).
§ See *Proceedings,* Am. Soc. C. E., Vol. XLIV, p. 39 (January, 1918).

of its scrutiny of papers and its more recent discussion of their merits, resulting in the following recommendations of awards:

"1. The Norman Medal to Mr. Benjamin F. Groat for his paper (1366) entitled 'Chemi-Hydrometry and its Application to the Precise Testing of Hydro-Electric Generators.'

"2. The J. James R. Croes Medal to Mr. Henry S. Prichard for his paper (1370) entitled 'The Effects of Straining Structural Steel and Wrought Iron.'

"3. The Thomas Fitch Rowland Prize to Mr. John Vipond Davies for his paper (1359) entitled 'The Astoria Tunnel under the East River for Gas Distribution in New York City.'

"4. The James Laurie Prize to Mr. H. R. Stanford for his paper (1354) entitled 'Pearl Harbor Dry Dock.'

"5. The Collingwood Prize for Juniors to Mr. Clement E. Chase for his paper (1362) entitled 'The Cherry Street Bridge, Toledo, Ohio.'

"Respectfully submitted,

"H. J. BURT,
S. EVERETT TINKHAM,
J. L. VAN ORNUM, *Chairman.*"

THE SECRETARY.—Mr. President, I have to report that this report of the Committee was received by the Board of Direction, and its recommendations as to the award of prizes unanimously adopted.

THE PRESIDENT.—The next order of business is the report of the Board on account of the final suggestions received from the various Districts. Have you that report?

THE SECRETARY.—Yes, sir.

The Secretary presented the report of the Tellers, as follows:

"TO THE BOARD OF DIRECTION:

"The undersigned tellers report the result of canvass of final suggestions for Members of the Nominating Committee in the several districts as follows:

"District No. 1.—Charles E. Trout	.....	156
J. S. Langthorn	.....	63
B. F. Cresson, Jr	.....	25
Scattering	.....	13
Total	.....	257

"District No. 2.—Clarence Blakeslee	.....	100
C. M. Spofford	.....	26
Charles R. Gow	.....	16
Scattering	.....	3
Total	.....	145

"District No. 4.—Robert Farnham		38
	John F. Murray	18
	C. J. Tilden	12
	Scattering	18
	Total	86
"District No. 7.—J. H. Darling		51
	H. E. Riggs	31
	William G. Raymond	15
	Scattering	6
	Total	103
"District No. 8.—C. A. Morse		109
	Richard Montfort	8
	W. H. Finley	4
	Scattering	6
	Total	123
"District No. 9.—C. E. Johnston		121
	Baxter L. Brown	41
	Scattering	6
	Total	168
"District No. 12.—Joseph Jacobs		19
	D. C. Henny	14
	E. B. Hussey	10
	Scattering	5
	Total	48

"Respectfully submitted,

"F. C. NOBLE,
LEWIS D. RIGHTS,
ALFRED D. FLINN."

The Districts were taken up separately, and by vote of the meeting, the following members of the Nominating Committee were appointed to serve for two years:

CHARLES E. TROUT	*Representing*	*District*	*No.*	*1*
CLARENCE BLAKESLEE	"	"	"	*2*
ROBERT FARNHAM	"	"	"	*4*
J. H. DARLING	"	"	"	*7*
C. A. MORSE	"	"	"	*8*
C. E. JOHNSTON	"	"	"	*9*
JOSEPH JACOBS	"	"	"	*12*

THE SECRETARY.—Mr. President, will you then declare that Messrs. Charles E. Trout, Clarence Blakeslee, Robert Farnham, J. H. Darling, C. A. Morse, C. E. Johnston, and Joseph Jacobs are appointed members from the several Districts to the Nominating Committee?

THE PRESIDENT.—I declare the men whose names have been read appointed as members of the Nominating Committee.

I call for the report of the Special Committee on Engineering Education; Mr. FitzGerald:

DESMOND FITZGERALD, PAST-PRESIDENT, AM. SOC. C. E.—Mr. President, it has been a good many years that your Committee has been working on this subject, but it gives me great pleasure to say that our work is now nearing completion. I propose to read a short report now, in the way of a progress report, and probably the permanent report of the Committee—the final report—will be made before the end of the year, transmitting a very important document to this Society from the Carnegie Foundation.

Your Committee would much rather be found on the side of those who admire the spirit and work of the schools than on the side of those who are constantly endeavoring to magnify their shortcomings.

Especially is this true in this great time of emergency, with the greatest war of history on our hands, and we, ourselves, at an average distance of about 5 000 miles from the battle-fields.

We must all appreciate the work in aid of the war, which the technical schools have suddenly been called on to accomplish, and the magnificent way in which they have responded. They have given up their time and energies to every problem with zeal and intelligence, and with no other aim than a desire to develop all their great resources of training and equipment for the service of the country. Even those in closest touch with their work know only a fraction of their efficiency, but they know that, if we ever succeed in maintaining a great army and navy on the other side of the wide ocean which separates us from Europe, it will be because trained graduates from the schools, and the schools themselves, have linked arms with the practical men of affairs in order to win this war.

Though a thankless task, we must turn our eyes to such matters as lack of co-ordination among instructors, confusion of curricula, and unbalanced methods of instruction; and these are exactly the problems which your Committee has been studying during the past nine years. Now, at last, a ray of light breaks across our work, and we are glad to report that there is the strongest promise that before the summer is here we shall have the pleasure of transmitting to the Society the report of the Carnegie Foundation and of Dr. Mann, its expert, which we have been long anticipating.

Last year I stated that the report was ready for the printer. Further study made it apparent that the report would be of greater value to

engineers if it were simplified and condensed. This great work has been done, and Dr. Mann's report has been reduced from 175 pages to but 75, and in a few days it will be in the hands of the printer. Dr. Mann is present to-day, and will say a few words to you on this matter.

I wish to say here that I think the appreciation of this Society is due to the Carnegie Foundation, to Dr. Pritchard and to Dr. Mann, for the admirable way in which they have responded to every desire of the Committee to examine this subject with the greatest possible care; and they have devoted long years and very large sums of money, without a cent of expense to this Society, to the accomplishment of this result.

Dr. Mann is here, and, with your permission, Mr. President, I am going to ask him to say just a few words to you on this subject, because the work is now nearing the end.

THE PRESIDENT.—We shall be pleased to hear from Dr. Mann.

C. R. MANN, ESQ.—Mr. President and Gentlemen, two years ago the answers to the questionnaire that was being conducted under the auspices of your Committee and the committees of the other National Societies showed that we had progressed to a point where we had discovered that contracting engineers, when asked the question: What qualities in young men do you look for and regard as most important in selecting men for particular jobs? had mentioned personal qualities, such as character, personality, initiative, and so on, seven times as often as they had mentioned knowledge of technical science. That was the report two years ago.

Last year, and a year ago, the report indicated that the analysis of the problem had been carried to a point where we saw that this emphasis on personal qualities required a type of education which should motivate the student, and which would correlate and interrelate the subjects in such a way that the student would see or learn to connect things that ought to be connected, and would do it with enthusiasm.

Now, that solution, or that stage of the problem, was not satisfactory, either to the Committee or to the schools, because we all know (who are in school work) that interrelation and motivation have been the problems of education for a great many years, and that motivation, particularly, is open to the criticism that it leads to "sugar-coating the pill", and, "let Johnnie do what he likes", and things of that sort, which is not at all what we want in engineering education.

During the past year, because of the great crisis which had come upon the Government, and because of the enormous amount of attention that had been given to this subject by the engineers themselves, we have been enabled to push the analysis of the problem one step further. I think this time we have pushed it to hardpan, and discovered a foundation on which we can safely build. This comes from the analysis

of the engineering problem. I think you will all agree that every engineering problem contains three essential elements, namely: science, practice, and cost; and, in its solution, these three elements have to be carefully considered.

I think you will all agree that the schools deal with the science with a fair degree—a large degree—of satisfaction. They deal to a less degree with the question of practice, that is, seeing that the science is so adapted to the practical conditions of manufacturing that the thing can actually be constructed; but, with the question of costs, the schools at present deal very, very little. There are a few of them that ask the boys to prepare bills of materials, and there are one or two places where the boys are resolved into a group of contractors for a short time to make a bid on some engineering structure.

Now, the entire control of engineering in this country rests in the hands of those who determine whether the value received, or the value that accrues from an engineering structure, is worth the cost; and that phase of the question is not dealt with at all in the engineering schools; and, therefore, we have analyzed the engineering curriculum to see what features have to be changed or what features added in order to introduce a training in the appraisement of values and costs in engineering work into the work of the schools, that is, an appraisement of the value of costs, which we believe to be the controlling and the essential factor, the most important factor, in the practical work, but it is a factor that is not receiving any attention whatever in the schools.

I may say that the organization of the report, as it has been appraisement of values and costs means, in applying entrance requireappraisement of values and costs means, in applying entrance requirements, in organizing the curriculum, the marks in grading, in organizing the faculty, and in the technical details of school work.

It is, of course, impossible to go into details here. I hope the report will be in your hands in a few weeks now, so that you can study the solution.

There is one other point that I want to present to this Society this morning. The engineering schools, as Mr. FitzGerald has said, have responded patriotically and loyally to the demands of the Government for training engineers and for maintaining engineering training during the war.

Because of the assistance which we received from this Society and from the other Founder Societies, it was possible to make arrangements with the War Department, whereby students in engineering, whom the schools are willing to certify as probably and likely to become valuable engineers, may remain in school and finish their training before taking up active service.

The development in the war preparations has now reached a stage where the various divisions of the Army, the Navy, and the Shipping Board are beginning to be able to tell the schools what particular types of training they need to have carried out. A committee has been working in Washington for the last six weeks, endeavoring to tell the schools, or find out for the schools, what types of training they can profitably take up for war work.

We have been unable, until very recently, to find out from the Government, or from the various branches of the Government, what types of training they need. That is the first question. Now, those needs are beginning to be apparent; for instance, two weeks ago the Signal Corps announced that they needed 500 radio engineers. There is a specific need which the schools can take up.

Now, the difficulty of meeting that need is that there is no organization, and no board, no bureau, no office in Washington, that is charged with the function of co-ordinating those needs for training for war purposes and the educational institutions; and the latter are at present in a state of great chaos. They are very eager to serve, but they do not know what to do, and there is no agency for correlating the demand for engineering training and the needs for supplying that training.

The committee that has been working on this has been endeavoring for a number of months to have such an agency established. I may say that this Society is directly interested in that, because, as I have followed the attempts of the various societies to be of service, it has seemed to me that they were having great difficulty in finding out from Washington what was needed.

There is a great need of some agency that will determine what engineering talent and ability is needed, and where it is needed, and then go to work and supply it. Now, I would like to suggest that this Society can be of service in helping the engineering schools into order, and into a helpful, useful relation to the Government, if they would bring such pressure as they can to bear upon the authorities at Washington to establish a co-ordinating agency for engineering interests there. Because, if we had a central office where all demands for engineering training were accruing and placed in order, if there were there men from the schools, who understand the schools and know what they can produce, to distribute those things into the proper channels in the schools, the efficiency of the entire machine would be enormously increased.

Therefore, I suggest—as a thing that this Society can do—the bringing of pressure to bear upon the officials in Washington to establish such an engineering agency. You have doubtless noticed that in the last two weeks there has been established such a central agency for the general situation of technical labor. They have established in the Department of Labor a bureau for studying labor conditions and

a bureau for employing labor to meet just the needs of the Government.

So far, the engineers are classed under that head, and the only agencies that I have been able to discover there to deal with the engineering question are those two bureaus.

Now, I rather think that those are good bureaus to connect up with, so that one office would deal with the whole question of technical service from the top to the bottom; but, at any rate, there is need of some centralizing authority in Washington to deal with this engineering problem; and I urge it upon your attention and hope that this meeting may take action in the matter. I thank you.

GARDNER S. WILLIAMS, M. AM. SOC. C. E.—Mr. President, allow me to say a word in reply to the report of the Committee. In 1905 I had the honor of establishing in the University of Michigan a course in which instruction upon the line of costs was given, and about 10% of the time of the senior class was devoted to that phase of the subject.

The matter was taken up the year following by the Department of Mechanical Engineering, and, to the best of my knowledge and belief, is still continued there. I think the Committee is somewhat behind the times.

DR. MANN.—You will recall that I said that some schools had introduced work of that sort, and it happens that the University of Michigan is one of them, because the course I mentioned a minute ago—to organize the class into a group of contractors who would bid on a certain engineering construction—is carried out at that University.

THE PRESIDENT.—If there are no further remarks, the Committee's report will be accepted.

The report of the Special Committee to Codify Present Practice on the Bearing Value of Soils for Foundations, etc.: Mr. Robert A. Cummings, Chairman. Is Mr. Cummings present?

Mr. Cummings presented his report, as follows:

"JAN. 16TH, 1918.

"TO THE AMERICAN SOCIETY OF CIVIL ENGINEERS:

"Your Special Committee appointed to Codify Present Practice and Report on the Physics of Soils, in relation to Engineering Structures, respectfully submits this interim report.

"During the past year your Committee held three meetings, and the Minutes have been published in the monthly *Proceedings* of the Society.

"The discussion of the last Report of your Committee has been carefully studied with appreciation and interest.

"Your Committee has continued the study of proposed definitions and classification of soils, but the results are yet incomplete.

"The labors of your Committee on granulometric analysis, sizing, grading, and charting, have met with much encouragement in a development of simple methods. These will be tested out and reported later.

"Your Committee has continued the study of published articles and data, and has in progress a descriptive classification of the manner in which soils give trouble.

"Your Committee has in preparation proposed uniform methods and devices for the practical testing of soils of foundations.

"These and other activities of your Committee, as of all similar investigations, are now very much restricted by the Great War. As individual units, your Committee members are devoting themselves to the service of the United States wherever possible, and your Committee is acting upon the suggestion made by your Board of Direction to subordinate its work to the National interests. For similar reasons, the Sub-committee of the United States Bureau of Standards, which is co-operating with your Committee in the scientific aspect of its problems, is unable to present a report at this time.

"Respectfully submitted in behalf of the Committee,

"ROBERT A. CUMMINGS,
"Chairman."

COMMITTEE:
WALTER J. DOUGLAS, *Secretary*
EDWIN DURYEA
E. G. HAINES
ALLEN HAZEN
J. C. MEEM
ROBERT A. CUMMINGS, *Chairman.*

THE PRESIDENT.—Is there any discussion on this report? If not, the report will be received.

The Report of the Special Committee to Report on Stresses in Railroad Track: Professor A. N. Talbot, Chairman. Is Professor Talbot present?

A. N. TALBOT, M. AM. SOC. C. E.—The Special Committee on Stresses in Railroad Track presents a Progress Report which has been printed* and distributed. Since this report was completed the Committee has continued its labors, and has done work on the distribution of pressures through ballast, on the effect of counterweight and excess counterweight in the locomotive, on the rail, and on the effect of curves. Mr. President, I move that this report be accepted as a report of progress, and that it be printed in the *Proceedings* and in the *Transactions.*

(Motion duly seconded.)

THE PRESIDENT.—All in favor of that motion will say "aye"; those opposed, "no". The motion is carried.

The Final Report of the Special Committee on Materials for Road Construction, and on Standards for Their Test and Use: W. W. Crosby, Chairman. Is Mr. Crosby here?

* *Proceedings,* Am. Soc. C. E., January, 1918. Papers and Discussions, p. 55.

THE SECRETARY.—No; but Mr. Tillson is.

THE PRESIDENT.—Will Mr. Tillson make the report for Mr. Crosby?

GEORGE W. TILLSON, M. AM. SOC. C. E.—Mr. President and Gentlemen: On account of the absence of the Chairman of this Committee, Col. Crosby, who is in the service of the United States, it has devolved upon me to present this report.

The report has at least one merit: It is final. During the last few years, when this Committee has presented its Progress Reports, it has held, subsequent to the Annual Meeting, meetings for informal discussions on the report, in order to get the ideas of other members of the Society interested in the subject, and also of men who were not members of the Society.

These meetings have been well attended, and the discussions have been full. The Committee has considered very carefully all the ideas introduced at those discussions, but has not been able to agree to, or to insert in the report, everything that has been presented, because, for one reason, in very many cases absolutely opposite ideas were expressed.

The Committee, therefore, does not expect that the report will suit every one. Possibly, or perhaps probably, it would not suit in every particular every member of the Committee itself. It is, however, a composite view of the members of the Committee. The Committee, too, wants to present again the idea, which I mentioned a year ago in presenting the Progress Report, and that is that a report of this kind on a subject which is, you might say, in an experimental stage even now, even if it were absolutely up to date at this time, could not be expected to be up to date one year from now; and, in order that this Society, or any society, may keep a subject like this up to date, it would require constant care, constant study, and an Annual Report, although this Committee does not recommend that.

The Committee, therefore, submits this report to the Society as its final action; and I want to move, Mr. President, the acceptance of the report and the discharge of the Committee from further consideration of the subject.

(Motion duly seconded.)

CLEMENS HERSCHEL, PAST-PRESIDENT, AM. SOC. C. E.—I would like to add to the motion the thanks of the Society to this Committee.

THE PRESIDENT.—The thanks of the Society will be added to the motion. Gentlemen, you have heard the motion. All in favor of accepting the report of the Special Committee on Materials for Road Construction, with the discharge of the Committee and the expression of the thanks of the Society to the Committee, will say "aye"; those opposed, "no". The motion is carried.

The Final Report of the Special Committee on Steel Columns and Struts: Mr. Lewis D. Rights, Chairman. Is Mr. Rights present?

LEWIS D. RIGHTS, M. AM. SOC. C. E.—Mr. President and Gentlemen: The report of the Special Committee on Steel Columns and Struts is also a Final Report. It was printed in the December *Proceedings,* so that by this time probably all the members have had a chance to look at it. The first pages, up to page 2432, give a history of the work of the Committee and republish material which was given in the Progress Reports of 1915, 1916, and 1917.

The gist of the report, probably, or the critical point, is on page 2444. The Committee discovered that heavy columns fell off in unit strength. This was investigated, and was found to be due to the material. The Committee looked for some critical point which would give the correct indication of the strength of the material, and was not able to discover any former definitions, so, after considerable deliberation, it adopted a new term. This was not done hastily.

"The Committee has defined the critical point"—I am reading from the report—"as the point which is determined graphically by drawing a line tangent to the envelope of the stress-strain curve, having a slope of one-half that of the last run-up line for its straight, or nearly straight, portion."

You will see by the diagram on page 2444 (Fig. 7) an illustration of this method of determining the critical point. To say it another way, you will notice that the modulus of elasticity shown for this particular diagram is 28 000 000, which is the point where the modulus of elasticity becomes half of that or 14 000 000. Possibly, in another way, it may be said to be the point where the rate of deformation becomes twice what it is somewhere near the origin of the stress-strain point.

The Committee adopted this method of determining the critical point, both for specimen tests and for the full-sized columns in Table 22, which shows the relation between the ultimate strength, as determined both by the tests and by the Bureau of Standards, the yield points, and the new term, the "Useful Limit Points", and shows, as far as the Committee can see, that this new term, the "Useful Limit Point", bears a very distinct and constant relation to the full-sized strength of columns.

I might say a word right here in regard to the publication of diagrams. The Committee has a large number of diagrams and tables, tests, and logs, and it was thought at first that these should be published in full, so as to give the membership the benefit of all the work which had been done, but when the matter was investigated, it was found that the cost of publishing all these logs, diagrams, and other information would probably amount to more than the total cost of the Society's publications for this year. Naturally, it was prohibitive; so that the Committee has given only a few diagrams as samples.

The curves of Useful Limit Points and Safe Working Values are shown at the end of the report on Plate LXI. That shows the strength as indicated by the Useful Limit Points, and it shows a suggested curve, or—it is not a curve—the working values recommended by the Committee.

Now, in regard to the question of a rational column formula, the Committee in its report speaks of the desire of engineers for such a formula. I quote from the report, page 2456:

"Numerous theoretical formulas have been promulgated from time to time, all of them based on entirely elastic material of uniform grade. At the present time it seems useless to the Committee to attempt to write a rational column formula, from a theoretical standpoint, with the possibility of variations of 28% in the strength of the material."

The Committee desires at this time to give public expression and thanks to the work done by the Bureau of Standards. Dr. Stratton, the Director, and his assistants have given the Committee every consideration. They followed out the suggestions made by the Committee, and all the work on tests has been done without expense to the Society; I am sure, therefore, that the Committee and the Society are grateful to the Director and his assistants for the work they have done.

Now, the only other matter to report is the suggestion of the Committee that it be discharged. This work is done, as far as it can go at the present time. The Bureau of Standards cannot continue making tests, because it is busy with war work, and the result is that the work will have to wait until after the war.

The Committee believes that it should make a final report and be discharged, and that, later, possibly when the war is over, if there is a demand for it, a new committee can better take up the work which has been carried on by this present Committee.

J. V. Davies, M. Am. Soc. C. E.—In seconding the motion of Mr. Rights for the discharge of the Committee, I would like to state that, in discharging the Committee with the thanks of this Meeting, it should be done with reference to the Board of Direction, so that the date of the termination of this Committee can take place at the option of the Board of Direction, when the answers have been received and criticisms of the report made, so as to enable the Committee to reply to any such criticisms.

C. E. Fowler, M. Am. Soc. C. E.—I would like to amend that by requesting the appointment of a new Committee, if this Committee is going to be discharged, because the time between now and the end of the war, which may be three years from now, can be profitably spent in planning the new campaign; and this Committee has only gotten to the border of the promised land, so far as bridge engineers are concerned.

It seems to me that it would be a decided catastrophe to drop a committee of this sort entirely out of sight for the duration of the war; and if the mover will accept that suggestion that a new committee be appointed, I would be glad——

THE PRESIDENT.—The formula for appointing a new special committee is quite elaborate. It would take considerable time. It seems to me that the wishes of the members of the Committee should be regarded, and they have requested to be discharged. Perhaps Mr. Davies' suggestion might be met by what I believe is the custom, that the members of Special Committees in presenting their final reports should take sufficient interest in such reports properly to reply to ensuing discussions and criticisms; in fact, we could not consider it a final report until that were done.

Mr. Davies, will you agree to that understanding of the matter?

MR. DAVIES.—Yes, sir.

MR. FOWLER.—In which case, I would like this Meeting to vote down the discharge of the Committee. If any members want to resign, and other members be appointed, that can be easily done. I do not think the Committee ought to be discharged if it is going to take a long while to appoint another one.

THE SECRETARY.—Mr. President, in this connection I would like to read the last clause of Article VI of the Constitution:

"Whenever, in the judgment of the Board of Direction, a special committee, appointed in the above prescribed manner, by reason of the long time required for its appointment, would be defeated in its object and be of no avail, then the Board of Direction shall be authorized to appoint forthwith a special committee to act in each case and report on each subject * * *."

In other words, it is within the power of the Board of Direction at any time to appoint such a committee, if the Board feels that it is necessary. I thought, perhaps, that might help the matter out a little.

THE PRESIDENT.—Are there any other remarks? If not, you will vote on the motion to accept the final report of the Committee on Steel Columns and Struts, and discharge the Committee with the thanks of the Society. All in favor of the motion will say "aye"; opposed "no". The motion is carried.

THE SECRETARY.—Pardon me. I have two written communications, one from Mr. Gustav Lindenthal and one from Mr. Henry S. Prichard. They have asked me to present these discussions on this report to the Meeting. It is for the Meeting to say whether they will hear them, or whether they will order them printed.

LEONARD METCALF, M. AM. SOC. C. E.—I move that the discussions be received without being read.

(Motion duly seconded.)

THE PRESIDENT.—All in favor of the motion that the discussions be received and read by title only will say "aye"; opposed, "no". The motion is carried.

The Progress Report of the Special Committee on the Regulation of Water Rights: F. H. Newell, Chairman. Is Mr. Newell present?

THE SECRETARY.—That report was printed in the December, 1917, *Proceedings,* and the gist of it was that it requested that the Committee be continued.

THE PRESIDENT.—If there is no objection, that will be assumed.

The proposed revision of the Constitution:

NELSON P. LEWIS, M. AM. SOC. C. E.—Mr. President, I presume discussion is in order, as this is a regular order of business?

THE PRESIDENT.—Yes, sir.

MR. LEWIS.—Mr. President and Members of the Society, we have presented to us for our consideration to-day a complete revision of the Constitution of the Society. It contains many decided improvements over the present instrument by which the Society is governed. I think, however, that it also contains a number of rather serious objections. The time is, of course, very brief at this Meeting for a careful consideration of those objections.

Many of the amendments relate entirely to form. Their purpose has undoubtedly been to secure a somewhat more logical arrangement; in some cases, perhaps, better literary form. In many cases these efforts have been successful. Some of the changes are so slight that they might almost be called trivial; for instance, in Article I, Section 2, it is proposed to have that read: "The office of the Society shall be in the City of New York" instead of "shall be located in the City of New York."

In Article II, Section 1, "The Corporate Members shall be designated as Members and Associate Members," instead of, "The Corporate Members of this Society shall be designated as Members and Associate Members."

A little later "Graduation from a school of engineering of high standing" is proposed instead of "Graduation from a school of engineering of recognized reputation."

In one more instance, "Honorary Members shall be persons of eminence" is proposed, instead of as it now reads, "Honorary Members shall be chosen only from persons of acknowledged eminence."

These are specimens that run all through the proposed changes to the Constitution.

If I may briefly summarize the more important articles proposed: in Article I the changes are chiefly as to form. It includes a provision relative to subsidiary associations. This includes a plan already in force, and is a very excellent one. It provides that these associations

shall be authorized by the Board of Direction, and shall conduct their business under by-laws from the Board of Direction.

In Article II, the age of Juniors is raised two years.

A Member "shall have had responsible charge of the construction of engineering work of high grade" instead of "responsible charge of work" as at present. The purpose, I think, is evident, and many of us would be in sympathy with it; but it does seem an unfortunate and needlessly narrow definition of engineering. It would apparently exclude men who have not had the required number of years "of responsible charge of the construction of engineering work of high grade," but who might have done splendid work for the Profession in research investigations; and I think it not unlikely that there are members of the Society of whom we are all proud to-day, who, if they were to be measured by that standard, might not be found eligible.

It is provided that Associates are hereafter to be known as Affiliates. Probably the purpose of this was to make a sharp distinction between Associates and Associate Members, Associate Members being Corporate Members, and there having been some misconception, I think, as between the relative rating of Associate Members and Associates.

Affiliates shall be persons of distinction. That may be rather a hard specification to define.

Article III. Matters of discipline, as well as admissions, are left entirely to the Board of Direction, to be conducted under by-laws to be adopted by the Board of Direction. There are no such by-laws now, and the Board shall adopt and may amend at pleasure these by-laws.

The principle is undoubtedly correct. The present machinery for disciplining members is cumbersome and wholly unsatisfactory; but there seems to be very grave objection to the entire omission from the Constitution of any constitutional guaranty to any Member of the Society, who may be subject to charges, which will ensure him even a hearing, and which will specify the vote of the Board of Direction by which the extreme penalty of expulsion may be imposed.

By-laws were suggested in the report of the Committee, by the Board of Direction, when this revision of the Constitution was suggested, but they are in embryo—no, not even in embryo—they may never be born, and they may be changed at will.

Now, undoubtedly, it may be said that this thing should be left to the Board of Direction. It should; and yet, we have confidence in our Board of Direction, I think. We nominate and elect them, and yet I doubt if the Board of Direction, which we elect and in which we have that confidence, would want to have this entire and absolute control over disciplinary measures, without the slightest sug-

gestion of the constitutional protection of a man under charges, not even that he may be heard; and, as the Constitution or the proposed by-law is worded, it would appear that even the letter-ballot by the Board of Direction—that 20 affirmative ballots—might be required in a minor matter of discipline, such as a reprimand or a warning.

It seems to me that this objection is fundamental, and the organic law should insure that protection to any Member.

In Article IV the changes are mostly in form. The Board is left to deal with those in arrears for dues under by-laws which it may adopt.

Exemption from dues now granted to Members of the Society, when they have reached the age of 70 years and have paid dues for 25 years, is omitted, and Corporate Members and Affiliates must have paid dues for 35 years in order to reach the age of exemption. That perhaps is unobjectionable, and yet it seems a little needlessly severe; but it should be noted that there is a possible lack of protection for Affiliates, as Corporate Members and Affiliates must have paid dues as such for 35 years before they are exempt. The new Affiliates cannot have paid as Affiliates for 35 years.

The intent of the Constitution is undoubtedly to insure to any Member, in any grade at present, whatever rights he may have, and it may be hypercritical to point out that possible lack of protection for Affiliates; and yet it is there.

In Article VI there are several important changes. The Board is to adopt by-laws and to amend them at will, apparently, at any meeting, without previous notice. It is only required that they advise the Members of the Society of the by-laws which they adopt, and of the changes which they may make; and yet this Board is to deal with matters affecting the rights and status of any member of the Society under by-laws as meager and as fragile as these.

It provides, also, for an Executive Committee, which shall possess all the powers of the Board of Direction when that Board is not in session. The members of that Committee, apparently, so far as we know and see, could amend by-laws, could take action prejudicial to the interests of the Society and the rights of Members, and such action would be legal.

Now, you may say that this is very unlikely. It is unlikely; but, gentlemen, it should be impossible. The organic law of this great Society of more than 8 000 members should certainly make it impossible for any Board of Direction, no matter what confidence we have in it, to do a thing of that kind, however unlikely it is that they would attempt to do it. It seems to me a very fundamental and fatal defect.

It also omits the provision that the Secretary shall be elected annually by the Board of Direction at the meeting to be held within 20 days after the Annual Meeting. The time for the election is not specified. I know it appears from the report that there has been some dis-

cussion as to having this election before the Annual Meeting. That seems to be unwise, that an outgoing Board should elect the Secretary to serve the incoming Board.

By Article VII the Nominating Committee is to be elected as prescribed by the Board through its by-laws—by-laws which may be changed at any meeting, or possibly by the Executive Committee.

Nominees are to be elected only from Corporate Members resident in their Districts. Now, this is probably in the interest of representative government, and I think it probable that it is a wise provision. There is, of course, the possibility that Members so elected would regard their duty to their constituents in their particular Districts as paramount to their duty to the Society; but I think that danger is negligible.

In Article VIII the changes are simply a rearrangement and modification of the material, the only important change being that a quorum at a meeting of the Board at the time of the Annual Meeting should be 15 instead of 9, while at other meetings it remains at 5.

It is perhaps a little difficult to understand why this particular meeting of the Board—the briefest meeting and perhaps in many respects the most important of the year—should require an increase in the members in attendance to create a quorum.

Article IX is intended to simplify proposed amendments. They must be referred to the Board of Direction. That Board, however, is limited in its action to approval or revision as to form and validity only.

I cannot but believe that the Board of Direction can give more patient and careful deliberation to these amendments, and deal with the substance as well as the form in a much more satisfactory fashion than this meeting is at present able to do at a quarter past 12, when the meeting must adjourn at 1 o'clock.

In referring to one of the sections, gentlemen, I think I omitted to refer to the proposed change excluding the Secretary from the Board. This was presented to the membership 3 years ago, in 1914, and not only failed to receive the necessary two-thirds' vote, but received only 42% of the total vote cast.

Now, this revision is before us. What are we to do with it? I think it deplorable that the proposition of the adoption of an instrument, which has had so much time spent upon it and contains so many excellent changes, should have been jeopardized by the inclusion of some of the objectionable features, and I certainly think them objectionable—those which I have pointed out—and in view of this situation, Mr. Chairman and gentlemen, I offer this resolution:

"*Whereas,* the proposed revision of the Constitution of the Society, while containing many desirable changes, includes provisions which would define more narrowly the experience required for eligibility to

the grade of member; would vest in the Board of Direction full control over procedure relating to discipline under by-laws which may be adopted by the said Board and changed at its pleasure; would confer upon an Executive Committee of six (6) all the powers of the Board when the said Board is not in session, with the sole requirement that the other members of the Board shall be advised of its action, and would effect changes which have recently been submitted to the membership and rejected by a decisive vote; and

"*Whereas,* it appears that the opinion of the members of the Board of Direction was greatly divided as to some of the changes; and

"*Whereas,* the sections of the present Constitution relative to amendments only permit changes 'pertinent to the original amendment' or reference to a committee for further consideration, which committee must report at the next general meeting, after which the amendment must go to letter ballot; therefore, be it

"*Resolved,* that the proposed revision of the Constitution be ordered to letter ballot with the statement that, in view of the objections above indicated, it is the sense of this meeting that it should not be adopted; and be it further

"*Resolved,* that a copy of this preamble and resolution be sent to each corporate member with the form of ballot for voting upon the proposed revision."

I offer that resolution, Mr. President.

MR. WILLIAMS.—I support the resolution, Mr. President.

THE PRESIDENT.—You have heard the resolution, and it is now before you for discussion.

Apparently, no one desires to speak. All in favor of the resolution will say "aye"; opposed, "no". It is carried.

Announcements by the Secretary.

THE SECRETARY.—Mr. President, everybody here has a copy of the programme, in detail, of the Meeting; and I do not think that I need go into that at all.

I would like to read, however, the following communication from Headquarters, Seventy-seventh Division, Camp Upton, New York:

"HEADQUARTERS 77TH DIVISION,
"CAMP UPTON, N. Y., JANUARY 14TH, 1918.

"MEMORANDUM:

"1. The members of the American Society of Civil Engineers attending their annual meeting in New York City, January 16th and 17th, will visit Camp Upton on the 17th by special train arriving at 11:45 A. M., and leaving for New York at 3:30 P. M.

"2. The Commanding Officer, 302nd Engineers, will detail officers to escort the visitors and show them all points of interest in camp. Immediately after arrival a review will be given in honor of the

American Society of Civil Engineers on the Engineer drill grounds. Following the review, the visitors will be taken through the barracks and mess halls of the Engineer regiment. Immediately afterwards there will be an exhibition of hand grenade practice and mining work by the Engineers.

"3. From the Engineer section, the visitors will observe a demonstration of bayonet combat under the supervision of Captain Brown, assisted by Sergeant Major Covington, of the British Army.

"4. The visitors, on the conclusion of the above practice, will be received by the Commanding General at Division Headquarters, at which time an opportunity will be given to view the camp from Lookout Tower.

"5. Luncheon will then be served at the Acker-Merrall-Condit Hotel; following which an exhibition infantry attack will be given by 'L' Company, 307th Infantry, followed by a machine gun demonstration given by the Machine Gun Co., 307th Infantry, at the machine gun butts near the gas house.

"6. Following the machine gun demonstration, a demonstration in the use of gas defence will be given at the gas house under the Officer in Charge of Gas Defence.

"7. The visitors will then be taken in trucks for a brief inspection of the Division target range, returning in time to entrain at 3:30 P. M.

"8. All arrangements will be under the direction of Colonel C. O. Sherrill, 302nd Engineers, with whom the officers in charge of demonstrations will confer as to details.

"By command of Brigadier General Johnson:

"WM. N. HASKELL,
"Major, Field Artillery,
"Acting Chief of Staff."

"Official:
"LLOYD C. GRISCOM,
"Adjutant General,
"Adjutant."

It will be seen from this that the matter of conducting the party, which is to visit Camp Upton to-morrow, has been taken out of the hands of the Committee of Arrangements, and is in better hands. It seems to me that this is perhaps not the time to express our thanks, but I do think it was a very nice thing for those people down there to turn the whole camp over to us to-morrow.

THE PRESIDENT.—Are the Tellers appointed to canvass the vote for officers ready to report, Mr. Ridgway?

ROBERT RIDGWAY, M. AM. SOC. C. E.—Yes, sir; shall I read the report?

THE PRESIDENT.—If you please.

"33 West 39th St.,
New York, N. Y.
January 16th, 1918.

"To the Sixty-Fifth Annual Meeting
American Society of Civil Engineers:

"The Tellers appointed to canvass the ballots for Officers of the Society for 1918 report as follows:

"Total number of ballots received		1618
Ballots without signatures	16	
" stamped, not signed	7	
" from members in arrears of dues	5	
Total number not entitled to vote		28
Ballots canvassed		1590
Defective	0	

"For President:

Arthur N. Talbot	1585
Scattering	5

"For Vice-Presidents:

John F. Coleman	1572
Nelson P. Lewis	1565
Scattering	9

"For Treasurer:

George W. Tillson	1587
Scattering	2

"For Directors:

District No. 1	George W. Goethals	1539
	Andrew M. Hunt	1536
	Scattering	14
District No. 4	Samuel Tobias Wagner	1544
	Scattering	0
District No. 9	Edward E. Wall	1530
	Scattering	7
District No. 10	Milo S. Ketchum	1539
	Scattering	1
District No. 11	Harry Hawgood	1535
	Scattering	3

"Robt. Ridgway
Alexander Haring
T. C. Culyer
James F. Sanborn
C. V. V. Powers
S. H. Woodard
F. W. Gardiner
Tellers."

THE PRESIDENT.—I declare the gentlemen, whose names have been read, elected to the various offices.

At the end of my term as President, I desire again to thank you for this great honor; I have not even yet learned to understand why it was accorded me. I also desire to thank the officers and the Board of Direction and the Members of the Society for their continuous and complete support in the duties which have devolved upon me.

I shall ask Past-Presidents Stearns and FitzGerald to escort the President to the Chair.

A. N. TALBOT, PRESIDENT, AM. SOC. C. E.—Members of the American Society of Civil Engineers. I thank you for this very generous reception. I do not quite find words to express my appreciation of the great honor you have conferred upon me in thus electing me to the Presidency of the American Society of Civil Engineers.

It is rightly regarded as the highest honor which can be conferred upon a Civil Engineer by his professional brethren. I have long had high esteem for the engineer's work, and for the responsible part he has taken in the development of the resources and the industries of this country; and I believe that in the future the part which he will play in the world's work will be even larger and more extended, and that the world will be brought to realize and to recognize more fully the work which the engineer should do for the world's welfare, and in this time of world war, in the outcome of which the engineer is taking so great a part—a war which must not be ended until it is ended right—the engineer has indeed a great responsibility to his country. When peace comes he may be expected to lead in the arts of peace, as he has done in the arts of war.

I am pleased to feel that my selection to this position is a recognition of the engineering teacher, that adjunct and co-partner in the Engineering Profession, who is striving to train young men to learn the art of engineering.

There is no one more enthusiastic about the work of the engineer, no one more devoted to its interests, than the engineering teacher. I thank you for this honor. With it, of course, comes responsibility. However, as I look forward to this, I am comforted by the fact that the Board of Direction, in whose hands the business of the Society is placed, is made up of twenty-nine other Members, who will have to share the responsibility.

I am sure that all the Members of the Board will be glad to have your suggestions, your criticisms, and your co-operation; and I feel that I can assure you that the officers of the Society and the Board of Direction have the interests of the Society at heart, and will do their best to carry on its business.

THE SECRETARY.—The only other announcement, Mr. President, that I think it is necessary to make, is that a meeting of the Board

of Direction for organization will be held immediately on adjournment of this Meeting. The time specified was 1 o'clock. If the Board can meet before 1 o'clock, it would help matters very much, because its members want to go on that excursion and eat luncheon in the tunnel, which is an unusual experience for a Board.

THE PRESIDENT.—The members of the Board will please take note of this.

A MEMBER.—Where do they meet? In the Board Room?

THE PRESIDENT.—In the Board Room.

There being no further business, I declare that the Annual Meeting is adjourned.

EXCURSIONS AND ENTERTAINMENTS AT THE SIXTY-FIFTH ANNUAL MEETING

Wednesday, January 16th, 1918.—After the Business Meeting, in the Engineering Societies Building, lunch for about 300 members was served.

At 1 P. M., through the courtesy of the Public Service Commission for the First District, D. L. Turner, M. Am. Soc. C. E., Chief Engineer, and P. McGovern and Company, A. A. Cohill, Chief Engineer, Contractors for building the Rapid Transit Tunnels, about 350 members visited and inspected Route 61, which forms a part of the 60th Street, East River, and Queens Plaza Route. The members were conveyed in automobile stages, and crossed the Queensboro Bridge to Queens Plaza, where they were the guests of the Contractor at luncheon in the tunnel.

At 8.15 P. M. there was a Theatre Party at the Hippodrome, and afterward a Supper-Dance at the Hotel Astor at which there was an attendance of about 225 members and guests.

Thursday, January 17th, 1918.—The day was devoted to an excursion to Camp Upton, Long Island. Through the courtesy of the Division Commander, an opportunity was afforded to the members of the Society and the members of their families to visit the camp. A special train, leaving the Pennsylvania Railroad Station at 9.30 A. M., conveyed the party, consisting of about 570 members and guests, to Camp Upton, arriving at 11.45 A. M.

Col. C. O. Sherrill, Commanding the 302d Engineer Regiment, detailed officers to escort the members and show them all points of interest. Immediately after arrival there was a review on the Engineer drill grounds in honor of the Society. Following the review the Commanding General addressed the members, and then the barracks and mess halls of the Engineer regiment were inspected, and there was an exhibition of hand grenade practice and mining work by the Engineers. In the hall of the Knights of Columbus the members witnessed a demonstration of bayonet combat under the supervision of Capt. Brown, assisted by Sergeant-major Covington, of the British Army.

The party was then given an opportunity to view the camp from Lookout Tower. Luncheon was served at the Acker-Merrall-Condit Hotel, following which there was an exhibition attack by "L" Company, 307th Infantry, and a machine-gun demonstration by the Machine Gun Company, 307th Infantry, and a demonstration in the use of gas defense.

The members entrained at 3.30 P. M. and arrived in New York at 6 P. M.

At 8.30 P. M. there was an illustrated lecture by Dougles W. Johnson, Associate Professor of Physiography, Columbia University, dealing with the topographic features of the terrain of northern and northeastern France, and with their influence on the strategy of the war. At this lecture about 700 members and guests were present. Following the lecture there was a social and informal Smoker, at which the attendance was about 800.

The following list contains the names of 750 members of various grades who registered as being in attendance at the Annual Meeting. The list is incomplete, as some members failed to register, and it does not contain the names of any of the guests of the Society or of individual members. It is estimated that the total attendance was about 1 200.

Abbott, C. P..White Plains, N. Y.
Adams, E. G.....New York City
Aertsen, G.....Philadelphia, Pa.
Aikenhead, J. R...New York City
Aims, W. I.....New York City
Alexander, H. J...New York City
Allen, C. M.....Worcester, Mass
Allen, E. Y.....New York City
Allen, F. W.Mount Vernon, N. Y.
Allen, Henry C...Syracuse, N. Y.
Allen, H. D.....Newark, N. J.
Allen, Kenneth...New York City
Allen, L. E.,
Bellville, Ont., Canada
Alvord, J. W.....Chicago, Ill.
Ammann, O. H.,
South Amboy, N. J.
Anderberg, Edward,
New York City
Andrews, G. C.....Buffalo, N. Y.
Armstrong, A. F...Albany, N. Y.
Ashbaugh, L. E..New York City
Atkinson, A.,
New Brunswick, N. J.
Atwater, H. C.White Plains, N. Y.
Atwood, T. C.....Atlantic, Mass.
Auryansen, F.....Jamaica, N. Y.
Austin, W. E.....New York City

Babcock, W. S....New York City
Bailey, A. R.....New York City
Baird, H. C.....New York City
Bamford, W. B....Belmar, N. J.
Barbour, F. A.....Boston, Mass.
Barnes, O. F....Jersey City, N. J.
Barnes, T. Howard.New York City
Barnett, R. P.....New York City
Barney, P. C.....Brooklyn, N. Y.
Barney, S. E...New Haven, Conn.
Bartlett, W. A..Waterbury, Conn.
Bartoccini, A.....New York City
Barton, C. L.....New York City
Bascome, W. R....New York City
Basinger, J. G....New York City
Baum, George.....Yonkers, N. Y.
Bean, E. D.....Bridgeport, Conn.
Beardsley, J. W.,
East Orange, N. J.
Beck, R. E.....Brooklyn, N. Y.
Beebe, H. R.....Utica, N. Y.
Beekman, J. V., Jr..Boston, Mass.
Beggs, G. E.....Princeton, N. J.
Belknap, J. M....Brooklyn, N. Y.
Bellows, S. R.....Brooklyn, N. Y.
Bennett, J. W. F..New York City
Berger, Bernt.....New York City
Bernegau, C. M...New York City
Besselievre, E. B..Bayonne, N. J.
Betts, R. T.....New York City
Beugler, E. J.....New York City
Bevan, L. J.....New York City
Bilyeu, C. S.....New York City
Binger, W. D.....New York City

Bishop, G. W..Newtonville, Mass.
Blackmore, G. G..New York City
Blair, C. M....New Haven, Conn.
Blakeslee, C....New Haven, Conn.
Blakeslee, H. L.New Haven, Conn.
Blanchard, A. H..New York City
Bleistein, B. J.....Astoria, N. Y.
Boardman, C. S....Buffalo, N. Y.
Boardman, H. E..New York City
Boardman, W. H..Newark, N. J.
Bogart, John.....New York City
Bogert, C. L.....New York City
Boorman, K. M...New York City
Bornefeld, C. F...New York City
Boucher, W. J.,
Long Island City, N. Y.
Boughton, W. H.,
Poughkeepsie, N. Y.
Bouton, H. R.....New York City
Brace, J. H.....New York City
Bradbury, R. R.,
East Pleasantville, N. Y.
Bradley, F. E....New York City
Brainard, A. S.,
Camp Upton, N. Y.
Bramwell, G. W..New York City
Branne, J. S.Mount Vernon, N. Y.
Breed, H. E.....Albany, N. Y.
Breitzke, C. F....Boonton, N. J.
Brennan, J. G.....Albany, N. Y.
Brennan, J. L....New York City
Breuchaud, Jules..New York City
Briggs, W. C....Brooklyn, N. Y.
Bringhurst, J. H..Baltimore, Md.
Brodie, O. L.....New York City
Brooks, J. P.....Potsdam, N. Y.
Brown, Alfred T..New York City
Brown, T. E.....New York City
Brown, W. E....Brooklyn, N. Y.
Brownell, L. D..Syracuse, N. Y.
Brush, W. W.....New York City
Bryan, C. W.....New York City
Buck, H. R.....Hartford, Conn.
Buehler, Walter.....Chicago, Ill.
Buel, A. W.....New York City
Buettner, O. G....New York City
Burpee, Moses.....Houlton, Me.
Burroughs, H. R..New York City
Burrowes, Paul de N.,
Point Pleasant, N. J.
Bush, E. W.....Hartford, Conn.
Byers, B. B. F....Pittsburgh, Pa.

Cadwallader, W. L.New York City
Carey, E. G....Bridgeport, Conn.
Carle, N. A.....Newark, N. J.
Carpenter, A. W..New York City
Carpenter, C. E...Yonkers, N. Y.
Carpenter, S. T. M..Buffalo, N. Y.
Carr, Albert..East Orange, N. J.
Carson, H. Y.....New York City
Carstarphen, F. C..Trenton, N. J.
Case, J. F.....New York City
Castleman, F. L....Pencoyd, Pa.
Chadbourn, W. H.New York City
Chappell, T. F.,
Au Sable Forks, N. Y.
Chase, Charles F.,
New Britain, Conn.
Chase, Clement E.,
Poughkeepsie, N. Y.
Chase, R. D..New Bedford, Mass.
Christian, G. L...Yonkers, N. Y.
Churchill, C. S.....Roanoke, Va.
Clapp, S. K..Grand Gorge, N. Y.
Clark, Watson G..Tenafly, N. J.
Clarke, E. W..Pleasantville, N. Y.
Clarke, G. C.....New York City
Clarke, St. John....Bogota, N. J.
Class, C. Frank..Harrisburg, Pa.
Clement, F. H..Philadelphia, Pa.
Cleveland, H. B....Albany, N. Y.
Closson, E. S....Montclair, N. J.
Cobb, L. R.....New York City
Coburn, H. L.....New York City
Codwise, E. B...Kingston, N. Y.
Codwise, H. R..Brooklyn, N. Y.
Coffin, T. A.....Phœnixville, Pa.
Coffin, T. DeL....Katonah, N. Y.
Cohen, A. B..East Orange, N. J.

Cohen, F. W.,
Upper Montclair, N. J.
Cole, E. S.....New York City
Cole, G. N.....New York City
Cole, H. J...Averill Park, N. Y.
Collins, C. D.....New York City
Collins, T. E.....Elizabeth, N. J.
Conard, W. R..Burlington, N. J.
Conley, C. G.Mount Vernon, Ohio
Connell, H. L.....New York City
Connell, W. H..Philadelphia, Pa.
Connelly, J. A....New York City
Conover, C. E.....New York City
Constable, Howard,
Kingston, Mass.
Constant, F. H..Princeton, N. J.
Conway, J. S..Washington, D. C.
Coombs, S. E.....New York City
Courtney, R. S....New York City
Coyne, H. L....Elmhurst, N. Y.
Crane, A. S.....New York City
Crary, A. P.....New York City
Critchlow, H. T...Trenton, N. J.
Crocker, H. S..Washington, D. C.
Crooks, C. H.....New York City
Cross, Hardy...Providence, R. I.
Cuddeback, A. W..Paterson, N. J.
Cullen, J. F....Philadelphia, Pa.
Culyer, T. C.Purdy Station, N. Y.
Cummings, R. A..Pittsburgh, Pa.

Dakin, A. H., Jr..New York City
Datesman, G. E.Philadelphia, Pa.
Davies, J. V.....New York City
Davis, A. L.....New York City
Davis, A. P...Washington, D. C.
Davis, B. H.....New York City
Davison, G. S.....Pittsburgh, Pa.
Delson, Isidore..Stapleton, N. Y.
Develin, R. G...Philadelphia, Pa.
De Witt, P. H.....Newark, N. J.
de Wyrall, Cyril,
Ridgefield Park, N. J.
Dilks, L. C.....Milliken, N. Y.
Dingman, C. F....Palmer, Mass.
Dodge, J. L.....Jamaica, N. Y.
Dodge, S. D.....Mahwah, N. J.
Donham, B. C....New York City
Dorrance, W. T.,
New Haven, Conn.
Dougherty, R. E.,
White Plains, N. Y.
Doyen, G. E.....New York City
Drinkwater, E.,
St. Lambert, Que., Canada
Dunham, H. F...New York City
Durfee, J. J.....Brooklyn, N. Y.
Dutton, C. H...Providence, R. I.

Earle, Thomas....Bethlehem, Pa.
Easby, M. W....Philadelphia, Pa.
Eberly, V. A...Washington, D. C.
Eckersley, J. O...New York City
Eddy, H. P.Newton Center, Mass.
Edwards, D. G.....Hollis, N. Y.
Edwards, W. R.,
Washington, D. C.
Eide, Torris.....New York City
Elwell, C. C...New Haven, Conn.
Emerson, K. B....New York City
Evans, E. G.,
Moncton, N. B., Canada
Evers, Rudolph..Brooklyn, N. Y.

Fairlie, J. W.....New York City
Farley, J. M..White Plains, N. Y.
Farnham, A. B..Pittsfield, Mass.
Farnham, R.....Philadelphia, Pa.
Fay, F. H.....Boston, Mass.
Federlein, W. G.,
Rockville Centre, N. Y.
Felgenhauer, F. J.New York City
Files, T. H.....New York City
Fisher, E. A....Rochester, N. Y.
Fisher, H. T...Englewood, N. J.
Fitch, H. A....Kansas City, Mo.
FitzGerald, Desmond,
Boston, Mass.
FitzRandolph, W. S.,
New York City

Fletcher, Robert..Hanover, N. H.
Flinn, A. D.....New York City
Forbes, F. B.....New York City
Ford, F. L....New Haven, Conn.
Ford, Harry C....New York City
Ford, W. H....Philadelphia, Pa.
Foss, F. E.....New York City
Foster, E. H.....New York City
Fowler, C. E.....New York City
Fox, W. F.Rockville Centre, N. Y.
Frank, A. H.....Brooklyn, N. Y.
Franklin, C. M.,
Mount Vernon, N. Y.
Freeman, M. H...New York City
French, J. B.....New York City
Frommer, Charles,
Philadelphia, Pa.
Fuller, A. H.....Easton, Pa.
Fuller, F. L...New Haven, Conn.
Fuller, G. W.....New York City
Fuller, W. E..Dobbs Ferry, N. Y.

Gadd, R. F.....Hartford, Conn.
Gailor, C. F.....New York City
Gambier-Bousfield, G. E.,
New York City
Gandolfo, J. H...New York City
Gardiner, F. W...New York City
Gardiner, J. deB. W.,
New York City
Gardner, H. C....Lancaster, Pa.
Gardner, Warren..New York City
Gaston, L. P.....New York City
Gay, H. S.....Westfield, N. J.
Giesey, J. K.....New York City
Gifford, G. E.....New York City
Gildersleeve, A. C.New York City
Gillen, W. J.....New York City
Gilman, Charles...New York City
Gladding, H. H..New Haven, Conn.
Glander, J. H., Jr..New York City
Glover, P. H.....New York City
Golding, T. W.....New York City
Goldmark, Henry..New York City
Goldsborough, J. B.,
Croton-on-Hudson, N. Y.
Goodrich, C. R.....Utica, N. Y.
Goodrich, E. P....New York City
Gould, C. M.....New York City
Gould, R. R.....New York City
Granbery, J. H....New York City
Gray, William.....New York City
Greene, G. S., Jr..New York City
Greenlaw, R. W...New York City
Greenwood, E. E.Skowhegan, Me.
Gregory, C. E...Mt. Kisco, N. Y.
Gregory, J. H.....New York City
Gregson, A. C.....New York City
Greiner, J. E.....Baltimore, Md.
Griffin, G. A...Washington, D. C.
Groat, B. F.....Pittsburgh, Pa.
Grove, W. G.....New York City
Grover, W. A.....Dover, N. H.
Gunther, C. O....Hoboken, N. J.

Haas, P. L.....New York City
Haight, H. de R...New York City
Haines, E. G.,
Richmond Hill, N. Y.
Hallock, J. C.....Newark, N. J.
Halsey, W. H.Southampton, N. Y.
Hammond, G. T..Brooklyn, N. Y.
Hansel, Charles...New York City
Harby, Isaac.....New York City
Harding, H. S.....Hollis, N. Y.
Haring, Alexander,
New York City
Harrington, A. W.Yonkers, N. Y.
Harrington, W...New York City
Harte, C. R...New Haven, Conn.
Haskins, W. J....New York City
Hatt, W. K.....La Fayette, Ind.
Hauck, William...New York City
Havens, W. W.....New York City
Hayes, M. D.....New York City
Hayes, R. D....Stillwater, N. Y.
Hazen, W. N.....Orange, N. J.
Headley, W. T..Philadelphia, Pa.
Heiser, A. B.....Brooklyn, N. Y.

Heiser, W. J.....Brooklyn, N. Y.
Heller, J. W.South Orange, N. J.
Henderson, A. R.,
Jersey City, N. J.
Henry, P. W.....New York City
Hering, Rudolph..New York City
Hermanns, F. E...New York City
Herschel, Clemens.New York City
Hess, E. W.....Clearfield, Pa.
Hewes, V. H.....New York City
Hewett, B. H. M...New York City
Hickok, H. A.....Newark, N. J.
Higgins, C. H.....New York City
Higgins, J. W....New York City
Hill, H. C....Binghamton, N. Y.
Hill, N. S., Jr...New York City
Hinds, A. K.....Chester, Pa.
Hodgdon, B. A.East Orange, N. J.
Hodgdon, F. W.....Boston, Mass.
Hoff, Olaf.....New York City
Holbrook, A. R..Brooklyn, N. Y.
Holbrook, Percy...New York City
Holden, C. A.....Hanover, N. H.
Holland, C. M....Brooklyn, N. Y.
Holmes, G. D....Syracuse, N. Y.
Holmes, N. H.....New York City
Holtzman, S. F.,
Hastings-on-Hudson, N. Y.
Hoover, A. P....New York City
Hormel, A. A....Brighton, Mass.
Horne, H. W..Collinsville, Conn.
Houston, J. J. L.Philadelphia, Pa.
Howard, L. T....New York City
Howe, C. E.,
Hastings-on-Hudson, N. Y.
Howell, R. P..Phillipsburg, N. J.
Howell, W. A.....Newark, N. J.
Hoyt, J. C....Washington, D. C.
Hudson, C. W.,
Upper Montclair, N. J.
Humphrey, R. L.Philadelphia, Pa.
Humphreys, A. C.New York City
Hunt, A. M.....New York City
Hunt, C. A.....Brooklyn, N. Y.
Hunt, C. E.....New York City
Hunt, Chas. Warren,
New York City
Hurd, H. L..White Plains, N. Y.
Hurlbut, C. C...Montclair, N. J.
Hutchins, E.....New York City

Ingersoll, C. M...New York City

Jackson, J. F..New Haven, Conn.
Jacobs, R. H.,
Harrington Park, N. J.
Jewett, T. E.....New York City
Joachimson, M...New York City
Johannesson, S.,
Upper Montclair, N. J.
Johnson, A. N.....Chicago, Ill.
Johnson, G. A.....Newark, N. J.
Johnson, N. C....New York City
Jones, G. R.....Baltimore, Md.
Jones, H. L.....New York City
Joseph, J.....Brooklyn, N. Y.

Karner, W. J.....New York City
Keays, R. H....Jersey City, N. J.
Keith, H. C.....New York City
Keller, O. B.....New York City
Kelley, W. D.....Yonkers, N. Y.
Kelly, C. W...New Haven, Conn.
Kennedy, *Sir* John,
Montreal, Que., Canada
Kershaw, W. H...New York City
Ketchum, M. S.....Boulder, Colo.
Khuen, R., Jr....Pittsburgh, Pa.
Kimball, F. C.....Summit, N. J.
Kienle, J. A.....New York City
Kinney, W. M.....Chicago, Ill.
Kinsey, W. A.....Newark, N. J.
Kirkwood, H. C..Flushing, N. Y.
Kittredge, G. W..New York City
Knickerbocker, C. E.,
Washington, D. C.
Knight, H. M..Providence, R. I.
Knighton, J. A..New York City
Knowles, M.....Pittsburgh, Pa.
Knox, S. B.....New York City
Knutson, G. H....Jackson, Mich.

Kolb, H. J.....Brooklyn, N. Y.
Kornfeld, A. E....New York City
Kraus, A.....Brooklyn, N. Y.
Krause, M. C...Williamsport, Pa.
Krone, A. H.....Baltimore, Md.
Kuchar, F. M....Brooklyn, N. Y.

La Chicotte, H. A. Brooklyn, N. Y.
Landreth, O. H.,
Schenectady, N. Y.
Landreth, W. B.,
Schenectady, N. Y.
Lang, F. A.....New York City
Lange, T. F.....New York City
Langthorn, J. S..Brooklyn, N. Y.
Larsson, C. G. E..Plainfield, N. J.
Lathrop, H. M...Caldwell, N. J.
Lawrence, E. V...New York City
Leavitt, C. W....New York City
Lee, W. B.....New York City
Leete, P. R.....Boston, Mass.
Leighton, G.....Lyons, N. Y.
Leiser, F. Jr.....Longport, N. J.
Leser, H.....New York City
Lesley, R. W....Philadelphia, Pa.
Lewis, N. P.....New York City
Lex, W. I.....Philadelphia, Pa.
Liebmann, A.....New York City
Linsley, C. W.....Oswego, N. Y.
Lobo, C.....Brooklyn, N. Y.
Logan, W. S.....Newark, N. J.
Loomis, H.....New York City
Lowinson, O.....New York City
Lucas, G. L.....New York City
Ludwig, J. A.....New York City
Lundie, J.....New York City

MacCornack, C. W.,
Phœnixville, Pa.
MacDonald, C.....Trenton, N. J.
MacFeeters, J. O.,
Glen Ridge, N. J.
MacGregor, R. A..New York City
Machen, H. B....New York City
McCarthy, D. F. Bronxville, N. Y.
McClintock, J. R..New York City
McCollough, C. A. New York City
McDowell, F. F..Yonkers, N. Y.
McGrew, A. B....Pittsburgh, Pa.
McHenry, E. H.,
New Haven, Conn.
McIntyre, W.....Ardmore, Pa.
McMinn, T. J....Brooklyn, N. Y.
McNeal, J.....Easton, Pa.
McNulty, G. W...New York City
McPherson, R. H. New York City
Madden, J. H....New York City
Manahan, E. G...New York City
Manley, H., Jr....New York City
Manley, L. B...Philadelphia, Pa.
Marsh, F. B.....Tuckahoe, N. Y.
Martin, E. S.....New York City
Mason, F.....New York City
Matlaw, I. S..Camp Meade, Md.
Mattimore, H. S..Albany, N. Y.
Mayell, A. J.....New York City
Mead, C. A.,
Upper Montclair, N. J.
Meadowcroft, W..New York City
Mebus, C. F....Philadelphia, Pa.
Meem, J. C.....Brooklyn, N. Y.
Mehren, E. J.....New York City
Melius, L. L.....New York City
Mensch, L. J.....Chicago, Ill.
Meriwether, C.....Chicago, Ill.
Merriman, M.....New York City
Merriman, T.....New York City
Merryman, W. C..New York City
Metcalf, L.....Boston, Mass.
Michael, H. L.....Auburn, N. Y.
Michael, W. W..Kingston, N. Y.
Michener, H. P. Mt. Vernon, N. Y.
Miller, A. B.....Montclair, N. J.
Miller, M. M.....Yonkers, N. Y.
Miller, M. S.....Brooklyn, N. Y.
Miller, R. P.....New York City
Miller, S. F..South Orange, N. J.
Mitchell, S. P...Philadelphia, Pa.
Modjeski, R.....New York City
Mogensen, O. E...New York City

Moisseiff, L. S....New York City
Monsarrat, C. N.,
Montreal, Que., Canada
Moore, F. F.....New York City
Moore, W. H..New Haven, Conn.
Morgan, T. C....Brooklyn, N. Y.
Morrison, H. P.,
West New Brighton, N. Y.
Morse, C. F..Good Ground, N. Y.
Morse, W. L.....New York City
Moyer, A.....New York City
Muir, J. C.....New York City
Myers, J. H.....New York City

Neely, J. T.....Norfolk, Va.
Nelson, J. W....Brooklyn, N. Y.
Neumeyer, R. E...Bethlehem, Pa.
Newcomb, W. T.....Easton, Pa.
Newkirk, S. F., Jr.Bayside, N. Y.
Noble, F. C.....New York City
Norris, W. H.....Portland, Me.
North, A. T.....New York City
Norton, A. G..Middletown, N. Y.

Oakley, G. I...Little Falls, N. Y.
Odell, F. S....Port Chester, N. Y.
Ogden, H. N.....Ithaca, N. Y.
Okeson, W. R.,
South Bethlehem, Pa.
Olcott, E. E.....New York City
Olmsted, A. E.....New York City
O'Rourke, J. F....New York City
Orrok, G. A.....New York City
Ott, S. J.....Rutherford, N. J.
Owen, J.....Newark, N. J.
Oxholm, T. S.,
New Brighton, N. Y.

Paddock, H. C.....New York City
Paine, H. A.....New York City
Parker, C. J.....New York City
Parker, J. L.....New York City
Parlin, R. W.....Brooklyn, N. Y.
Parsons, H. De B..New York City
Payrow, H. G....Bethlehem, Pa.
Pegram, G. H....New York City
Pendlebury, E....Arlington, N. J.
Perkins, E. T.....Chicago, Ill.
Perkins, W. W. C.Conneaut, Ohio
Perrine, G.....New York City
Perry, F. W.....New York City
Perry, J. P. H....New York City
Perry, L. E.....Trenton, N. J.
Pett, C. E.....New York City
Peverley, R. St. L.New York City
Pfau, J. W.....New York City
Phillips, A. E..Washington, D. C.
Phillips, A. L...Philadelphia, Pa.
Phillips, H. C...Philadelphia, Pa.
Phillips, J. H..Glen Ridge, N. J.
Plumer, H. E....New York City
Pohl, C. A.....New York City
Pollock, C. DuB...New York City
Pommerer, R. W.,
White Plains, N. Y.
Pond, F. H.....New York City
Pond, H. O.....New York City
Poore, H. C.,
East Braintree, Mass.
Porter, J. E.....Yonkers, N. Y.
Porter, J. M.....Easton, Pa.
Post, C. W.....Albany, N. Y.
Powell, C. U....Flushing, N. Y.
Powers, C. V. V..New York City
Pratt, F. E.....New York City
Preston, H. W.....Elmira, N. Y.
Price, F. O.....Brooklyn, N. Y.
Priest, B. B.....New York City
Purver, G. M....Brooklyn, N. Y.

Quimby, C. H., Jr.,
Washington, D. C.
Quimby, H. H..Philadelphia, Pa.
Quincy, C. F.....New York City

Randorf, C. A.....Buffalo, N. Y.
Rankin, E. S.....Newark, N. J.
Rapalje, DeW..East Orange, N. J.
Reed, H. B.....New York City
Ray, G. J.....Hoboken, N. J.

Reed, W. B.....New York City
Reeves, W. F.....New York City
Reid, H. A.....Brooklyn, N. Y.
Reidpath, R. J.....Buffalo, N. Y.
Reimann, R.....Relay, Md.
Reynolds, J. O...Brooklyn, N. Y.
Rice, G. S.....Brooklyn, N. Y.
Richardson, C....New York City
Richardson, J. D..Corona, N. Y.
Richardson, R. D...Scranton, Pa.
Richmond, J. P. W.,
New York City
Ridgeway, R.....New York City
Rights, L. D.....New York City
Ripley, H. L.....Boston, Mass.
Robbins, F. H....New York City
Roberts, H. W....New York City
Roberts, T. C..East Orange, N. J.
Robinson, G. L....New York City
Robson, R. H.....New York City
Rodman, G. E.....New York City
Rogers, A. W.....Buffalo, N. Y.
Rogers, E. H.West Newton, Mass.
Rohde, C. F.....Brooklyn, N. Y.
Rohrer, J. B.....Lancaster, Pa.
Ruckes, J. J., Jr..New York City
Rugg, W. F..White Plains, N. Y.
Rumery, R. R....New York City
Ryan, M. H.....New York City
Ryder, E. M. T...New York City

Sackett, A. J.....New York City
Sackett, R. L..State College, Pa.
Sacks, S. I.....Philadelphia, Pa.
Sampson, G. A.....Boston, Mass.
Sanborn, F. B.....Boston, Mass.
Sanborn, J. F....New York City
Saville, C. M....Hartford, Conn.
Sax, P. M.....Philadelphia, Pa.
Schaeffer, A.....New York City
Schermerhorn, H. O.,
Albany, N. Y.
Schmidt, M. E...New York City
Schneeweiss, A. E..Clifton, N. J.
Schofield, H. A..Philadelphia, Pa.
Schwarze, C. T...New York City
Schweizer, R., Jr.,
Ridgefield Park, N. J.
Schwiers, F. W., Jr.,
New York City
Scott, W. V.....Flushing, N. Y.
Seaman, H. B.Washington, D. C.
Seabury, G. T...Providence, R. I.
Seaman, W. H..Glen Cove, N. Y.
Searle, C. D.....New York City
Selby, O. E.....Cincinnati, Ohio
Serber, D. C.....New York City
Shailer, R. A.....New York City
Shaw, A. M.....New Orleans, La.
Shaw, G. H. T.....Chicago, Ill.
Sheldon, P.....Hartford, Conn.
Shelley, H. T...Philadelphia, Pa.
Shenehon, F. C.,
Minneapolis, Minn.
Sherman, A. L...Mansfield, Mass.
Sherrerd, M. R....Newark, N. J.
Sherron, G. A....Norwalk, Conn.
Shertzer, T. B....New York City
Shoemaker, L. H..Pittsburgh, Pa.
Shoemaker, M. N..Newark, N. J.
Sieling, L. J.....Red Bank, N. J.
Sikes, Z. H.....Yonkers, N. Y.
Simpson, C. R....New York City
Sitt, W. T.....New York City
Skillin, E. S.....New York City
Skinner, J. F....Rochester, N. Y.
Sloan, S. A.....Philadelphia, Pa.
Smith, A.....Bayonne, N. J.
Smith, C. Elmore,
New Brighton, N. Y.
Smith, V. C.....Dayton, Ohio
Smith, F. V.....New York City
Smith, H. E..Binghamton, N. Y.
Smith, H. S....Wilkes-Barre, Pa.
Smith, J. Waldo..New York City
Smoley, C. K.....Scranton, Pa.
Smoyer, L. I..Woodhaven, N. Y.
Snell, H. B.....Brooklyn, N. Y.
Snell, T. C. B....New York City
Snow, J. B....Forest Hills, N. Y.

Spaulding, C. L..New York City
Spear, W. E..Camp Upton, N. Y.
Sperry, H. M.....New York City
Spilsbury, E. G...New York City
Splitstone, C. H...New York City
Spooner, R. N.....New York City
Stark, C. W.....New York City
Starr, H. H....Philadelphia, Pa.
Stearns, F. L.....New York City
Steffens, W. F....New York City
Stein, J. B.....Brooklyn, N. Y.
Steinhauser, H. H.,
Brooklyn, N. Y.
Steinman, D. B...New York City
Stengel, C. H.....New York City
Stephens, A. W...New York City
Stevens, C. H...Philadelphia, Pa.
Stevenson, W. F.,
New Rochelle, N. Y.
Stiles, A. I.....New York City
Stevens, C. H...Philadelphia, Pa.
Stevens, H. C....New York City
Stoddard, R. F....Milford, Conn.
Stone, S. J....Garden City, N. Y.
Stowitts, G. P....Yonkers, N. Y.
Strachan, J.....Brooklyn, N. Y.
Stuart, E.....Harrisburg, Pa.
Swift, W. E..New Canaan, Conn.
Swindells, J. S...New York City

Taber, G. A.....Brooklyn, N. Y.
Talbot, A. N.....Urbana, Ill.
Talbot, F. M....Glen Ridge, N. J.
Talbot, K. H.....Pittsburgh, Pa.
Taylor, C. F.....New York City
Taylor, W. G.....Newark, N. J.
Terry, J. H....Philadelphia, Pa.
Thacher, E.....New York City
Thayer, N. E.....New York City
Thomes, E. H....Jamaica, N. Y.
Thompson, S. C..New York City
Thomson, A. Jr.,
East Orange, N. J.
Thomson, T. Kennard,
New York City
Tidd, A. W...White Plains, N. Y.
Tilden, C. J.....Baltimore, Md.
Tillson, G. W....Brooklyn, N. Y.
Timberlake, S. M..Brooklyn, N. Y.
Tinker, G. H....Cleveland, Ohio
Tomlinson, C. P..Hartford, Conn.
Tower, J. W.....New York City
Tretter, G. A.....Roanoke, Va.
Tribus, L. I.....New York City
Triest, W. G.....New York City
Trout, C. E.,
West New Brighton, N. Y.
Trow, F. H.....Kingston, N. Y.
Tucker, L. W.....New York City
Tull, R. W.....New York City
Tuska, G. R.....New York City
Tuttle, A. S.....New York City
Tye, W. F. Montreal, Que., Canada

Ungrich, M. J....New York City
Upton, J.....Flushing, N. Y.

Vallely, W. P....Brooklyn, N. Y.
Value, B. R.....New York City
Van Horne, J. G..New York City
Vincent, J. I.....New York City
Vinton, T. M.....New York City
Voetsch, C.....Utica, N. Y.
Voynow, C. B...Philadelphia, Pa.

Waddell, J. A. L...Kansas City, Mo.
Wadsworth, J. E..New York City
Wagner, S. T...Philadelphia, Pa.
Wahlman, P.....New York City
Wait, B. H.....New York City
Waite, D. C.....Brooklyn, N. Y.
Waite, G. B.....New York City
Walker, C. I.....New York City
Walker, J. J..Dobbs Ferry, N. Y.
Walton, H. C.....Boston, Mass.
Ward, E. A....Jersey City, N. J.
Wardle, E. B.,
Grand Mere, Que., Canada
Warnock, W. H..Edgemere, N. Y.
Wasser, T. J...Jersey City, N. J.

Watson, C. H..Great Neck, N. Y.
Watson, R. M..Rutherford, N. J.
Webster, A. L....New York City
Webster, G. S...Philadelphia, Pa.
Wegmann, E.....New York City
Weiskopf, S. C....New York City
Wells, C. E..White Plains, N. Y.
Wells, G. E....Naugatuck, Conn.
Welty, H. T.....New York City
Wendt, E. F...Washington, D. C.
Wentworth, C. A....Wayne, Pa.
Weymouth, A....Flushing, N. Y.
Wheatcroft, H. B., Jr.,
New York City
Whipple, G. C..Cambridge, Mass.
Whitcraft, L. N.Hackensack, N. J.
White, L.....New York City
White, T. S....Beaver Falls, Pa.
Whitney, G. C....Brooklyn, N. Y.
Whittier, T. T...Brooklyn, N. Y.
Wich, B.....Brooklyn, N. Y.
Wickham, H. R..Brooklyn, N. Y.
Wiggins, R. R..Garden City, N. Y.
Wilcock, F.....Brooklyn, N. Y.
Wiley, W. H.....New York City
Williams, C. G..Plainfield, N. J.
Williams, G. S..Ann Arbor, Mich.
Williams, J. P. J..New York City
Willoughby, J. E.,
Wilmington, N. C.
Wilmot, J.....New York City
Wilmot, S.....New York City
Wilson, T. L...Canterbury, Conn.
Winsor, F. E....Providence, R. I.
Winsor, G. A..Pleasantville, N. Y.
Winsor, H. D..Westerleigh, N. Y.
Wise, C. R.....Passaic, N. J.
Wise, R. S.....Passaic, N. J.
Witmer, F. P..East Orange, N. J.
Wolfe, F. C....Bridgeport, Conn.
Wolfe, F. G.....Scranton, Pa.
Wölfel, P. L.....Pittsburgh, Pa.
Wolff, A. D., Jr....Hudson, N. Y.
Wolff, R. B.....New York City
Wolpert, O.....New York City
Woodard, S. H...New York City
Woodcock, H. W..Brooklyn, N. Y.
Wortendyke, N. D.,
Jersey City, N. J.
Wyckoff, C. R...Hartsdale, N. Y.
Wyman, A. M..Philadelphia, Pa.

Yates, C. C.....New York City
Yates, P. K.....New York City
Yates, W. H.....New York City
Yereance, W. B..New York City
Young, C. G.....New York City

Zipser, M. E.....New York City

SOCIETY ITEMS OF INTEREST

Relations Between the Canadian Society of Civil Engineers and This Society

The following resolutions, adopted by the Council of the Canadian Society of Civil Engineers, at its meeting on November 27th, 1917, in reply to the resolutions adopted by the Board of Direction of the American Society of Civil Engineers,* are printed here for the information of the membership:

"*Whereas,* the Council of the Canadian Society of Civil Engineers has received a copy of the Resolution adopted by the Board of Direction of the American Society of Civil Engineers at a meeting held on October 9th, 1917, expressing the desirability of the closest co-operation and cordial relationship between the American Society of Civil Engineers and the Canadian Society of Civil Engineers, and

"*Whereas,* the Council of the Canadian Society of Civil Engineers is in full accord with the sentiments and principles so clearly enunciated in the said Resolutions, therefore be it

"*Resolved,* that the Council of the Canadian Society of Civil Engineers record its hearty appreciation and express its thanks to the Board of Direction of the American Society of Civil Engineers for the kindly interest shown by the Resolutions, and be it further

"*Resolved,* that the Council of the Canadian Society of Civil Engineers co-operate with the Board of Direction of the American Society of Civil Engineers to the end that the terms of the said resolution may be carried into effect, and that the Council reciprocate the action of the Board by inviting the members of the American Society of Civil Engineers to take advantage of the facilities offered by the Canadian Society of Civil Engineers and make themselves at home in its rooms and attend its meetings whenever they may visit Montreal.

"*Be it further Resolved,* that a Committee of the Canadian Society of Civil Engineers, consisting of the President, Past-President, and two members of the Council, be requested to communicate with the Board of Direction of the American Society of Civil Engineers with a view to making arrangements for giving effect to the terms of the said Resolution, and further,

"*That* a copy of these Resolutions be sent to the Board of Direction of the American Society of Civil Engineers."

Professional Classes War Relief

The following letter from the Secretary of the Professional Classes War Relief of America has been received by the Secretary, and is published for the information of the membership.

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* *Proceedings,* Am. Soc. C. E., Vol. XLIII, p. 642 (November, 1917).

"JANUARY 29, 1918.

"MR. CHAS. WARREN HUNT,
"*Secy., American Society Civil Engineers,*
"33 West 39th St.,
"New York City.

"DEAR MR. HUNT:

"Our Organization has reached the point where we are prepared for active relief of professional men who have enlisted, who are in the civil service, who are in civilian life, or of the families of such.

"The main obstacle to such relief is the hesitancy of this class to make known their needs. Relief cases have to be sought out. We have found some cases. Many more exist. We ask you to co-operate with us by making, through your organization, the following inquiries:

"(1) Do you know of any cases, civilian or otherwise, where relief is needed by a professional man or his family?

"(2) Will you make it your business to inform your brother professionals of this war relief, and not only to be on the alert for all situations deserving relief, but in view of the difficulty of contact with them, to make all possible inquiry as to such situations?

"(3) Will you inform us immediately of all such cases as may come to your attention?

"For your co-operation accept our thanks and that of those whom we shall help through such co-operation.

"Very sincerely yours,
"CARRINGTON PHELPS,
"*Secretary.*"

Student Branches

The following report is printed for the information of the membership.

"JANUARY 9, 1918.

"TO THE BOARD OF DIRECTION,
"AMERICAN SOCIETY OF CIVIL ENGINEERS.

"Your committee appointed to investigate the wisdom of establishing Student Branches of the Society begs to report:

"1. That the activities of its members on account of the war have precluded a ready getting together for the consideration of the subject.

"2. That while the correspondence with members of the Society is on the whole favorable to the establishment of such Student Branches there are well disposed objections to such action.

"Those favorable to the project give as a reason the good of the Society by creating an interest in it among prospective engineers while young. Those objecting, while conceding good to the Society, claim that a greater good would result to the profession, and ultimately to the Society, by leaving the student free to pursue more general subjects rather than concentrate on strictly professional subjects.

"3. That the greatly decreased attendance in engineering colleges due to the war, and the necessity of preparing young men as speedily as possible to do their part in the war, makes this an inopportune time to inaugurate such a policy, even should it be decided wise under normal conditions.

"4. Under the circumstances, your committee recommends that further consideration and report be deferred until after the close of the war; or, indefinitely postponed."

"Respectfully,
"M. E. COOLEY,
"Chairman."

"COMMITTEE:
"M. E. COOLEY,
"WILLIAM CAIN,
"CHARLES D. MARX,
"GEORGE F. SWAIN,
"JOHN L. VAN ORNUM."

Hydro-Electric Development

Statement submitted to a special committee of the United States Chamber of Commerce, January 14th, 1918, on behalf of Engineering Council, by Calvert Townley, Esq.

"It is my pleasant duty to appear before you by vote of the Executive Committee of Engineering Council, in response to your kind invitation of January 10th. Being empowered, as it is, to speak for the American Society of Civil Engineers, the American Institute of Mining Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers, on matters of common concern to all these bodies, Engineering Council's official utterances concern only such underlying principles and economic facts as are endorsed by all engineers and beyond the field of controversy. These Societies are scientific and professional. They, therefore, refrain from expressing views on legal, political, and commercial questions, except when such are closely linked with essential engineering facts. The statements which I am privileged to make to you are not expressions of my personal views, nor of those of any group. They have been submitted to, and approved by, the Executive Committee of Engineering Council which believes them to fall within the definition given.

"The introduction of electricity as a means for transmitting power over considerable distances, and its subsequent rapid development, completely changed the status of hydraulic power. Previously such power could only be used near falling water. Now it is commercially available in convenient form within a radius, in some instances, up to 200 miles, a fact that has made it possible to utilize water powers even when located in remote and inaccessible places. Indeed, to-day practically all hydraulic power developments of any magnitude are hydro-electric. Along with improvements in the art of electrical transmission have come equally rapid developments in the application of electricity. Electric light has become almost the universal illuminant. Electric motors largely drive our factories and propel all our street cars. They have made substantial progress in replacing steam locomotives on some large railroads, while the manufacture of nitrogenous products for explosives and fertilizers, and of such

products as abrasives and aluminum, depends for its commercial success on electro-chemistry. In an endeavor to supply the demand for electric current thus created, large central generating stations have been established in or near all large centers of population.

"In the light of the foregoing, it might seem reasonable to suppose that a large proportion of the modern demand for electric current would be supplied from the energy in falling water. Such, however, is not the case. Accurate statistics are difficult to obtain, but some approximate totals may prove illuminating. It has been estimated by a careful engineer that in 1911 there was more than 26 000 000 steam-engine horse-power capacity in use (including railroad locomotives) in the United States. The aggregate water horse-power developed and undeveloped has been computed as around 60 000 000. Of this latter, the U. S. Census of 1912 gives 4 870 000 as developed, and, in a report of January, 1916, the Secretary of Agriculture estimates this total to have been increased to 6 500 000. Making liberal allowances for correction in these several figures, it seems probable that there are in service from four to five times as many steam as water horse-powers, and that there are still undeveloped water horse-powers equal to at least twice that of all the steam capacity in service. Some of the undeveloped power sites are too remote from any market to be now utilized, and an uncertain number are not commercial prospects; but, even so, it is clear that the possibilities of additional development are very great.

"There are two fundamental causes which have militated against the substitution of hydro-electric for steam-electric power. One is economic and permanent; the other is statutory, and therefore subject to modification. Both reasons apply to some powers, but neither, fortunately, to all. The economic and permanent reason is high cost of development due to natural conditions. Electric power generated by falling water is inferior to that generated by steam in every particular except cost, and, therefore, water-driven service must be cheaper than steam-driven, in order to justify its existence. The price for service depends primarily on cost, and cost divides itself naturally into two main items, namely, operation (including maintenance), and fixed charges. As an hydro-electric plant consumes no fuel, its operating cost is less than that of an equivalent steam-driven plant. On the other hand, a steam plant costs usually only from one-fifth to one-half as much per unit of capacity as an hydro-electric plant; so that the latter must carry very much heavier fixed charges. This disability of water service is usually even greater than the ratio of the costs of two equivalent complete developments. A power enterprise seldom comes into being with a market for its entire ultimate output. Therefore, when steam is to be the motive power, only such capacity is installed as initial demands require, and the cost per unit is fairly proportional to that of the ultimate development. In a water development, on the contrary, a larger part of the cost is for riparian rights, for the dam, impounding reservoir, flume, forebay, etc., and for the transmission right of way, towers, etc., which must be, at the start, largely provided and constructed for the complete installation. The obvious result is a greater fixed charge per unit of capacity and a higher cost per horse-power delivered for sale. In forecasting the

commercial prospects of a power enterprise, the possible market must be studied, and, of course, a sale price for power decided upon. As this price is controlled by the cost of similar service from other sources, usually from steam, and as it must be attractive from the start, the additional burden of fixed charges on the initial part of an hydro-electric installation frequently forces the sale of its power below cost. The projectors of the enterprise then must rely for success on a sufficient subsequent increase in their markets. The possibility of an incorrect forecast of the extent of such increase and of the time when it may come imposes a serious business hazard against water and in favor of steam.

"It has been frequently pointed out that, as the Nation's coal supply is depleted, the cost of coal must rise, thus increasing the cost of steam-electric power as a competitor and raising the market value of hydro-electric power accordingly. The rising price of coal is a matter of record, but it is not so generally known that the improved efficiency of steam-producing machinery (boilers, engines, generators, and auxiliaries) has more than kept pace, so that the net cost of producing electric power from coal has steadily declined. As applied to the pre-war period, it may be stated that, over a period of 10 years, the cost of coal has risen on an average 1% per year, while the cost of electric power produced from coal has fallen on an average 2½% per year. In addition to these facts—still referring to pre-war conditions—the cost of steam-electric generating equipment has been greatly reduced. This fact is due partly to the introduction and subsequent improvement of the steam turbine, and in part to the great increase in the size of the units now available. There is nothing to indicate that the limit of improvement in the design of steam prime movers has been reached, or is even in sight. It is, therefore, a reasonable assumption that further advances in the art will continue to occur and to cut down both the fixed charges and the operating cost of steam power as a competitor of water. The largest modern steam turbine has now some twelve times the capacity which the largest reciprocating engine had 15 years ago. Stated another way, the cost of a steam-electric plant per unit of capacity just before the war was about one-third of what it was 15 years previously, while the energy it produces per pound of coal has increased 50 per cent. In addition to the development of steam prime movers, the Diesel or the internal combustion engine is now coming largely into use as a further competitor of water power where fuel oil is available, as in the southwestern district of the United States. The efficiency of these engines is considerably higher than that of the small-size steam turbine and reciprocating engine. There has not been a like improvement in the efficiency, nor a comparable reduction in cost, of the small reciprocating steam unit, and a natural result has been the expansion of central stations. As bearing on the water-power situation, obviously many sites which 15 years ago might have been developed to sell energy in successful competition with steam at its then cost could not now be so developed, and in consequence their development is no longer commercially possible. The cost of producing power from either water or steam is a function of load. Fixed charges remain practically unchanged in both instances, whether the output in energy be large

or small, but with a steam plant, increased output means increased fuel consumption, while a water plant operates, either with or without load, with but little variation in expense. To illustrate by a concrete example representing not unusual conditions, suppose we assume a steam plant using 2½ lb. of coal per kilowatt hour at a price of $3.00 per short ton, and having a plant or output factor of 35%—that is to say, an output equal to 35% of its theoretical output if every unit were loaded to capacity 24 hours each day of the year. Under these assumptions, the cost of fuel per unit of installed capacity per year would be $11.50, and if the other operating and maintenance charges be assumed to offset fairly those of a water installation of equivalent size, $11.50 represents the additional fixed charges which the hydro-electric plant could carry and produce power at an equal cost. If the fixed charges (interest, taxes, insurance, and amortization) total 11½%, therefore, the hydro-electric investment per kilowatt capacity could exceed that of steam by $100. This is not an abnormal excess. Many hydro-electric developments exceed the cost of equivalent steam-driven systems by much greater amounts, in which cases they become commercial projects only if either coal be more expensive per unit of output, or the plant factor be higher, or some other operating or maintenance conditions be more favorable. Further, as has been previously stated, hydro-electric power is inferior to steam-electric power. The reasons are elementary. Stream flow is subject to seasonal variation, and therefore to complete or partial interruption by drought in summer and by ice in winter. Floods are a menace. Long transmission lines may break, from wind or sleet, or the service be disarranged by lightning. The losses on such lines vary with load, and are frequently responsible for annoying pressure variations. On account of these and other reasons, hydro-electric power cannot prevail against steam competition at the same or a slightly lower price. It must be materially lower.

"We do not mean to imply that water power may not be a commercially practicable competitor of steam. Many successful hydro-electric installations give substantial proof to the contrary. We do wish most emphatically to combat, however, the widely held but mistaken view that any water-driven plant will produce power at lower cost than steam can, and that the margin is so large that investors generally are eagerly seeking a chance to put money into hydro-electric projects. The most careful investigation, frequently demanding substantial expenditure and the keenest scrutiny by experts, is needed to discriminate between worthy and commercially impracticable projects, and the difference is often so small that the imposition of even what seem to be minor burdens is sufficient to turn the scale in favor of steam and entirely prevent what might otherwise be a desirable hydro-electric development.

"The second condition which vitally affects development is statutory. After 10 years or more of discussion it has come to be generally agreed that our Federal laws discourage the development of a large proportion of the Nation's water powers, and remedial legislation has been considered at every session of Congress for many years. The legal obstacles are quite distinct and separate from the economic

facts which have been previously described, and are in addition thereto.

"Of the estimated 55 000 000 undeveloped water horse-power in the entire country, approximately 40 000 000 is located within the boundaries of the thirteen so-called Western water-power States. In these same States the Federal Government still retains as proprietor 760 000 000 acres, or more than two-thirds of the aggregate acreage of all these States taken together. In order to develop power in that section, it is, therefore, nearly always necessary to use some part of this public domain, if not for the dam site itself, at least for flowage, for transmission right of way, or for some other purpose. Existing law forbids such use except under permit issued by the Secretary of the Interior, and revocable without cause, at any time, by himself or his successor in office. It was once believed that revocation would only follow gross abuse, well established by evidence, but the drastic action of a one-time Secretary of the Interior, some years ago, to the contrary, disabused investors of this confidence, and demonstrated by a sad object lesson the insecure tenure afforded by existing law. As funds for hydro-electric development must come from private sources, the unstable tenure imposed by this condition has constituted so great a hazard of loss that the private investor has been loath to assume it. The unfortunate—almost disastrous—result has been practical stagnation in water-power development for many years. Many available power sites, not in the Western States, or not on the public domain, are on navigable streams. For each such project a special Act of Congress is necessary. The difficulty of obtaining suitable rights by this means has been found so very great as largely to discourage, even if not entirely to prevent, the developments affected. The several remedial laws recently considered by Congress recognize the essential facts, and agree that the remedy is a new law containing the following provisions, namely: An indeterminate permit, irrevocable during 50 years, except for cause judicially determined, and continuing thereafter unless and until the Federal Government either renews its permit on mutually agreeable terms, or for itself or through a new permittee, takes over, at its fair value, the hydraulic works and certain other parts of the development. The various proposed laws differ as to what parts of the development may be taken; as to whether or not rentals shall be paid, and their basis, and in many other particulars. Engineering Council does not consider itself expert in legal matters, and will not undertake to discuss the relative merits of the different plans. It should be pointed out, however, that an hydro-electric enterprise, being once successfully established, it is alike to the interest of the owners, of the Government, and of the public, that it should continue indefinitely without interruption. There is no economic reason to be served by a cessation, and the only reasons for providing a legal means of recapturing the installation and the water rights are, first, to preserve an additional measure of Government control against possible abuse by the permittee, and, second, against a remote contingency which might make it desirable that the Government would want to use the power for some other purpose. A successful power enterprise at the end of 50 years will

have multiplied the capacity of its initial installation many times, variously estimated at from five to twenty. In doing so, it is almost certain that, not only will the entire power available at the original site be fully developed, but other powers as well, which latter may or may not be dependent upon Government permits. Still further, in nearly all cases, steam plants as well as water plants are necessary. These steam plants are necessary to supplement hydro-electric power at period of low water and in case of interruption, as well as, in some instances, to provide increased capacity. In fact, modern practice is rapidly approaching that of providing steam capacity equal to 100% of hydro-electric for the purposes stated. In any event, the growth of the enterprise over a term of years will be continuous and progressive. There will never come a time when it may be said to have been completed and subject to no further expansion. This continuing growth makes burdensome and usually abortive any attempt to amortize the investment, while the investment in other water powers or in steam plants or both, interconnected with, and generally dependent for their economic operation on, the original development, renders the right to recapture that development only very onerous, and one which constitutes a serious impediment to the free and full development of an enterprise which is otherwise most desirable from all standpoints. With respect to power sites on the public domain and on navigable streams, the Government is in the position of seeking to have its resources developed without assuming any business hazard and without contributing either capital or credit. It would be unfortunate, in the light of past experience, if any new laws which may be enacted should put the Government in the position of bargaining with capital and of offering just sufficient incentive not to induce capital to undertake the developments desired, thereby, while apparently providing a remedy, in reality insuring a continuance of the present undesirable condition. Hydro-electric enterprises must compete with the demands of other industries for capital. Experience has shown that, even without the imposition of additional financial burdens, many of them are not sufficiently attractive to secure development, and, as the attractive prospects grade by imperceptible degrees into the unattractive ones, it is perhaps self-evident that every additional burden, however small, transfers a percentage of such projects from commercial into uncommercial prospects. It is our belief that the benefits afforded the communities served by cheap power, and to the Nation by the conservation of coal resulting from the substitution of a self-renewing for a non-renewable natural resource, are far more valuable than is the exact solution of the question of restricting the returns to capital to their irreducible minimum point. The present emergency, due to the progress of the war, has forcibly illustrated the importance of having developed the greatest possible number of water powers as a source of industrial power supply. As it consumes no fuel, the substitution of water for steam power would release to other uses all the extensive railroad and water facilities now engaged in transporting coal. It would similarly release a corresponding volume of labor now occupied in mining this coal and in operating such transportation agencies as well, and the boiler-room forces of the steam-power plants themselves."

Engineers in Government Service.

Engineering Council, through its American Engineering Service Committee, has, during the past few months, supplied to various Government departments and bureaus, in response to their requests, several thousand names of engineers from which men were to be selected to fill a great variety of positions in uniformed and civilian service for Army and Navy and other branches of the Government's activities in connection with the war, as well as for indirect service for manufacturers and contractors engaged upon Government war work.

To meet these demands, the American Engineering Service Committee has assembled, in its offices in the Engineering Societies Building, New York, extensive lists and much detailed information concerning engineers in all branches of the profession throughout the length and breadth of the land. It will readily be appreciated that, if these lists are to be maintained in the most useful condition to the Government and to Engineering Council, the committee should receive promptly information concerning each engineer who has gone into any kind of Government service, direct or indirect, so that a record may be made on his cards in the committee's office.

Engineers reading these lines, to whom this request applies, are urged to send at once their names, present addresses, and occupations in the Government service, with brief statement as to whether or not they are available for other service, to American Engineering Service Committee, Room 901, 29 West 39th Street, New York. Other readers are asked to bring this request to the attention of such engineers or to send information directly to the committee.

ANNOUNCEMENTS

The Reading Room of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

FUTURE MEETINGS

March 6th, 1918.—8.30 P. M.—A regular business meeting will be held, and a paper by Floyd A. Nagler, Jun. Am. Soc. C. E., entitled "Verification of the Bazin Weir Formula by Hydro-Chemical Gaugings", will be presented for discussion.

This paper was printed in *Proceedings* for January, 1918.

March 20th, 1918.—8.30 P. M.—At this meeting a paper by W. C. Hammatt, M. Am. Soc. C. E., entitled "Determination of the Duty of Water by Analytical Experiment", will be presented for discussion.

This paper is printed in this number of *Proceedings*.

SEARCHES IN THE LIBRARY

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that if it were generally known to engineers that such assistance could be had, many would avail themselves of it.

On October 1st, 1916, the Library of the American Society of Civil Engineers ceased to exist as such, and was merged in the Engineering Societies Library, adding 67 000 volumes to the collection which comprises also the former libraries of the American Institute of Mining Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers, and now has a total of 133 000 volumes and pamphlets. Containing, as the Library now does, the special collections mentioned, its scope is broadened, and, as it receives an unusually large number of technical periodicals, it is well equipped to continue the service formerly rendered by the Society Library.

The Engineering Societies Library offers this service at a cost which is trifling compared with the value of the time of an engineer who personally looks up such matters, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

It sometimes happens that references are found which are not readily accessible to the person for whom the search is made. In that case the Library is prepared to furnish photographic copies of the material at a small price per page. This method is particularly useful when there are drawings or figures in the text, which would be very expensive to reproduce by hand.

The Library is also able to provide translations of articles in foreign languages when desired.

Requests for searches, copies, translations, etc., should be addressed to the Director, Engineering Societies Library, 29 West 39th Street, New York City, who will gladly give information concerning the charges for the various kinds of service.

PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper in *Proceedings.*

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion will be published as heretofore in *Proceedings,* and set down for presentation to a future meeting of the Society, and on these oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which from their mathematical or technical nature, in the opinion of the Committee, are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in *Proceedings* in the same manner as those which are to be presented at meetings, but written discussions only will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions.*

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 35 of the Year Book for 1917.

LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

San Francisco Association, Organized 1905.

Jerome Newman, President; Nathan A. Bowers, Secretary-Treasurer, 502 Rialto Building, San Francisco, Cal.

The San Francisco Association of Members of the American Society of Civil Engineers holds regular bi-monthly meetings, with banquet,

and weekly informal luncheons. The former are held at 6 P. M., at the Palace Hotel, on the third Tuesday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at noon, every Wednesday, at the Engineers' Club, 57 Post Street, where special tables are reserved for members and guests of the Association.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in San Francisco, and any such member will be gladly welcomed as a guest.

(Abstract of Minutes of Meeting)

December 18th, 1917.—The Thirteenth Annual Meeting was called to order.

Ten-minute talks on "Why Engineers Have Not Achieved a Higher Rank Among the Professions", were presented by Messrs. C. D. Marx, A. H. Markwart, R. S. Chew, E. J. Schneider, C. J. Rhodin, and H. D. Dewell, and a committee consisting of Messrs. Bowers, Dewell, and Rhodin, was appointed to compile these addresses for publication and to report at the next meeting.

The following officers for 1918 were elected: President, Jerome Newman; Second Vice-President, W. C. Hammatt; and Secretary-Treasurer, Nathan A. Bowers.

Adjourned.

Colorado Association, Organized 1908.

Robert Follansbee, President; L. R. Hinman, Secretary-Treasurer, 1400 West Colfax Avenue, Denver, Colo.

The meetings of the Colorado Association of Members of the American Society of Civil Engineers (Denver, Colo.) are held on the second Saturday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary. The meetings are usually preceded by an informal dinner. Members of the American Society of Civil Engineers will be welcomed at these meetings.

Weekly luncheons are held on Wednesdays at 12.30 P. M., at Daniel's and Fisher's.

Visiting members are urged to attend the meetings and luncheons.

Atlanta Association, Organized 1912.

B. M. Hall, President; W. C. Spiker, Secretary-Treasurer, 1408 Candler Building, Atlanta, Ga.

Baltimore Association, Organized 1914.

Mason D. Pratt, President; Charles J. Tilden, Secretary-Treasurer, The Johns Hopkins University, Baltimore, Md.

Cleveland Association, Organized 1914.

Harry Fuller, President; George H. Tinker, Secretary-Treasurer, 516 Columbia Building, Cleveland, Ohio.

(Abstract of Minutes of Meeting)

January 5th, 1918.—The meeting was called to order at 12.30 P. M., at the rooms of the Cleveland Engineering Society; President Watson in the chair; George H. Tinker, Secretary; and present, also, 25 members.

The minutes of the meeting of June 30th, 1917, were read and approved.

On motion duly seconded, Messrs. J. R. Poe, W. P. Brown, and J. C. Spencer were appointed a Nominating Committee to select candidates for officers for 1918, which Committee, after consultation, presented the following names: for President, Harry Fuller; Vice-President, A. J. Himes; and Secretary-Treasurer, George H. Tinker.

On motion, duly seconded, these candidates were declared unanimously elected.

The Secretary read a report from the Committee on Military Highways and also a letter from Director J. V. Davies authorizing the discontinuance of that work. On motion, duly seconded, the report was accepted and ordered filed, and the Committee was discharged with thanks.

The resolution of the Executive Committee of the Board of Direction of the Society relative to the War Revenue Act of 1917, was read, and the subject was discussed by Messrs. Leffler, Ellms, Ritchie, Spencer, and F. C. Osborn.

On motion, duly seconded, the resolution was approved as the action of the Association, and copies were ordered sent to the Senators and Representatives in Congress from Ohio.

On motion, duly seconded, it was also decided to instruct the Legislative Committee to confer with other professional bodies requesting similar action.

A letter from H. R. Buck, M. Am. Soc. C. E., relative to Student Membership was read and discussed by Messrs. Leffler and Himes.

The Secretary announced the formation of the Pittsburgh Association of Members of the American Society of Civil Engineers and a suitable division of territory, the Pittsburgh Association to look after the interests of members in Pennsylvania and West Virginia and this Association of those in Ohio.

The proposed amendments to the Constitution of the Society were discussed by Messrs. Ritchie, Osborn, Leffler, Thomas, Poe, and Himes. On motion, duly seconded, it was the sense of the meeting, 25 members being present, that, as a matter of principle, the Secretary should not be a member of the Board of Direction.

The Secretary announced the purchase of a Service Flag with eight stars.

Adjourned.

Detroit Association, Organized 1916.

T. A. Leisen, President; Clarence W. Hubbell, Secretary, 2348 Penobscot Building, Detroit, Mich.

The regular meetings of the Association are held on the second Friday of December, April, and October, the last being the Annual Meeting.

District of Columbia Association, Organized 1916.

A. P. Davis, President; John C. Hoyt, Secretary-Treasurer, U. S. Geological Survey, Washington, D. C.

(Abstract of Minutes of Meeting)

December 29th, 1917.—The meeting was called to order; President Davis in the chair; John C. Hoyt, Secretary; and present, also, 21 members.

The following officers were elected for the ensuing year: President, Arthur P. Davis; Vice-President, D. S. Carll; and Secretary-Treasurer, John C. Hoyt.

The proposed revision of the Constitution of the Society was considered, and the following amendments were suggested:

Article II, Section 2, amend final clause to read: "shall have had responsible charge of engineering work of high grade for at least five years, and shall be qualified to design work of such character."

Article II, Section 4, amend final sentence to read: "The performance of the duties of a Professor of Engineering in such a school shall sidered, and the following amendments were suggested:
of engineering work."

On motion, duly seconded, Mr. John S. Conway was directed to present these amendments in behalf of the Association at the Annual Meeting of the Society, on January 16th, 1918.

Adjourned.

Duluth Association, Organized 1917.

F. E. House, President; Walter G. Zimmermann, Secretary, Wolvin Building, Duluth, Minn.

The regular meetings of the Association are held at noon on the third Monday of each month (usually at the Kitchi Gamma Club), with luncheon, followed by a short business session and the reading of papers. Visiting members of the American Society of Civil Engineers can secure from the Secretary definite information relating to the meetings, at which they will be welcomed. The Annual Meeting is held on the third Monday in May.

(Abstract of Minutes of Meeting)

January 21st, 1918.—The meeting was called to order; President F. E. House in the chair; Walter G. Zimmermann, Secretary; and present, also, 20 members and 3 guests.

To conform to the spirit of the heatless Monday regulations, it was decided to hold the February and March meetings of the Association on the third Tuesdays instead of the third Mondays.

Mr. W. H. Hoyt addressed the meeting on the plans for entertaining at the Annual Convention of the Minnesota Surveyors and Engineers Society to be held on February 21st-23d, 1918, in Duluth, and asked for the co-operation and attendance of the members of the Association at the Convention.

The Committee on Publication of the papers read before the Association was directed to publish the 1917 papers and assess the members for the expense.

A paper by Major T. F. McGilvray, of the United States Engineer Officers Reserve Corps, on "The Properties of Sandstone Concrete", was read by Mr. E. R. Lewis, and it was decided that a discussion of the paper, led by Mr. Clarence Coleman, should be the feature of the February meeting.

Adjourned.

Illinois Association, Organized 1916.

A. S. Baldwin, President; Edgar S. Nethercut, Secretary-Treasurer, 705 Michigan Ave., Evanston, Ill.

The regular meetings of the Association are held on the second Monday of March, June, September, and December, the last being the Annual Meeting. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary.

Louisiana Association, Organized 1914.

W. B. Gregory, President; Charles W. Okey, Secretary, Tulane University, New Orleans, La.

The regular meetings of the Association are held at The Cabildo, New Orleans, La., on the first Monday of January, April, July, and October.

Nebraska Association, Organized 1917.

George L. Campen, President; Homer V. Knouse, Secretary-Treasurer, 115 City Hall, Omaha, Nebr.

Regular meetings of the Association are held on the first Saturday of each month, except July and August, and at such places as may be appointed from time to time by the Executive Committee. The Annual Meeting is held in Lincoln, Nebr., on the second Friday in January.

An "Engineers' Round Table" is reserved daily for luncheon, at Courtenay's Restaurant, 17th and Douglas Streets, Omaha, to which all engineers are invited. Visiting members of the Society are especially urged to communicate with the Secretary when in the city.

(Abstract of Minutes of Meeting)

January 11th, 1918.—A joint meeting of the Nebraska Society of Engineers, the Lincoln Engineers Club, and the Association, was held at Lincoln, Nebr., at which addresses were presented as follows: "Military Engineering", by Clark E. Mickey, Assoc. M. Am. Soc. C. E.; "Concentrated Loads on Highway Bridges", by Milo S. Ketchum, M. Am. Soc. C. E.; and "Reorganization of the Lincoln Telegraph and Telephone Company Due to the War", by M. T. Caster, President of the Lincoln Engineers Club. The meeting was also addressed briefly by Mr. Soltan, President of the University Engineering Society, and by Col. H. L. Roberts, U. S. A. (*Retired*).

The Annual Meeting of the Association was called to order at 10.15 P. M.; President Darrow in the chair; Homer V. Knouse, Secretary; and present, also, 8 members and 1 guest.

The minutes of the meeting of December 8th, 1917, were read and approved.

The Secretary called attention to a deficit for 1917 and suggested that the dues of the members be increased to cover the probable increase in expenses of the Association during the coming year.

On motion, duly seconded, it was decided that a special assessment of 50 cents be levied on the members to cover the 1917 deficit and to assist in paying the dues of members in the Government service.

On motion, duly seconded, it was also decided to levy a special assessment of $1.00 to cover the extra expenses for 1918.

Messrs. Grant and Arend were appointed Tellers to canvass the ballots for Officers for 1918, and, on the presentation of their report, President Darrow announced the following elections: President, George L. Campen; Senior Vice-President, H. A. Holdrege; Junior Vice-President, John A. Bruce; and Secretary, Homer V. Knouse.

Matters relative to the Parent Society were discussed, and Dean Ketchum was requested to represent the Association in urging the adoption of an amendment authorizing the foundation of Student Branches.

Adjourned.

Northwestern Association, Organized 1914.

P. E. Thian, President; Ralph D. Thomas, Secretary, 508 South First Street, Minneapolis, Minn.

The meetings of the Association are held bi-monthly, alternating between St. Paul and Minneapolis, on the third Friday of each month. Information as to the time and place of such meetings will be furnished on application to the Secretary.

Philadelphia Association, Organized 1913.

Henry H. Quimby, President; C. W. Thorn, Secretary, 1313 South Broad Street, Philadelphia, Pa.

The regular meetings of the Association are held at the Engineers' Club of Philadelphia, 1317 Spruce Street, on the First Monday in January, April, and October, the last being the Annual Meeting.

Pittsburgh Association, Organized 1917.

Richard Khuen, Jr., President; Charles M. Reppert, Secretary-Treasurer, 422 City-County Building, Pittsburgh, Pa.

The Annual Meeting of the Association is held on the first Monday in October. The time and place of other meetings are not fixed, but this information will be furnished on application to the Secretary.

Portland, Ore., Association, Organized 1913.

G. B. Hegardt, President; C. P. Keyser, Secretary, 1147 East Yamhill Street, Portland, Ore.

(Abstract of Minutes of Meeting)

January 11th, 1918.—The Annual Meeting was called to order.

The following officers were elected: President, G. B. Hegardt; First Vice-President, H. A. Rands; Second Vice-President, W. G. Brown; Treasurer, Orrin E. Stanley; and Secretary, C. P. Keyser.

The office of Honorary President was established, and Mr. D. D. Clarke was elected thereto by acclamation, as a mark of the Associa-

tion's appreciation of his zeal and achievement as a member of the Society during the past 35 years.

The resolution of the Executive Committee of the Board of Direction of the Society, relative to the War Revenue Act of 1917, was presented, and it was decided to address communications to the Oregon Senators and Representatives as suggested and that individual members of the Association should use their personal influence to get the clause affecting engineers and professional men appealed or amended.

Adjourned.

St. Louis Association, Organized 1888 (Constitution Approved by Board, 1914).

J. A. Ockerson, President; C. M. Daily, Secretary-Treasurer, 34 East Grand Avenue, St. Louis, Mo.

The Annual Meeting of the Association for the election of officers and for the transaction of business, is held on the fourth Monday in November. Two meetings each year, for the presentation and discussion of technical papers, are held in the Auditorium of the Engineers Club of St. Louis and are open to members of the Associated Societies. Other "get-together" meetings are held regularly for dinner or luncheon on the fourth Monday of each month except July, August, and November.

San Diego Association, Organized 1915.

N. B. Kellogg, President; J. R. Comly, Secretary-Treasurer, 4105 Falcon Street, San Diego, Cal.

Seattle Association, Organized 1913.

Joseph Jacobs, President; Carl H. Reeves, Secretary-Treasurer, 444 Henry Building, Seattle, Wash.

The regular meetings of the Association are held at 12.15 P. M., on the last Monday of each month, at The Frye Hotel.

Southern California Association, Organized 1914.

H. Hawgood, President; H. W. Dennis, Secretary, 329 San Fernando Building, Los Angeles, Cal.

The Southern California Association of Members of the American Society of Civil Engineers (Los Angeles, Cal.) holds regular bimonthly meetings with banquet, at Hotel Clark, on the second Wednesday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 P. M. every Wednesday, and the place of meeting may be ascertained from the Secretary.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in Los Angeles, and any such member will be gladly welcomed as a guest at any of the meetings or luncheons.

Spokane Association, Organized 1914.

J. C. Ralston, President; B. J. Garnett, Secretary, City Hall, Spokane, Wash.

The regular meetings of the Association are held on the second Friday of each month, except July and August. The hour and place

of meeting are not fixed, but this information will be furnished on application to the Secretary

Visiting members are invited to attend the meetings and luncheons.

Texas Association, Organized 1913.

John B. Hawley, President; J. F. Witt, Secretary, Dallas, Tex.

Utah Association, Organized 1916.

George L. Swendsen, President; H. S. Kleinschmidt, Secretary-Treasurer, 306 Dooly Building, Salt Lake City, Utah.

The Annual Meeting of the Association is held on the first Wednesday in April. The time of other meetings is not fixed, but this information will be furnished on application to the Secretary.

PRIVILEGES OF ENGINEERING SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

Members of the American Society of Civil Engineers will be welcomed by the following Engineering Societies, both to the use of their Reading Rooms, and at all meetings:

American Institute of Electrical Engineers, 25 West Thirty-ninth Street, New York City.

American Institute of Mining Engineers, 25 West Thirty-ninth Street, New York City.

American Society of Mechanical Engineers, 25 West Thirty-ninth Street, New York City.

Associação dos Engenheiros Civis Portuguezes, Lisbon, Portugal.

Australasian Institute of Mining Engineers, Melbourne, Victoria, Australia.

Boston Society of Civil Engineers, 715 Tremont Temple, Boston, Mass.

Brooklyn Engineers' Club, 117 Remsen Street, Brooklyn, N. Y.

Canadian Society of Civil Engineers, 176 Mansfield Street, Montreal, Que., Canada.

Civil Engineers' Society of St. Paul, Public Library, St. Paul, Minn.

Cleveland Engineering Society, Chamber of Commerce Building, Cleveland, Ohio.

Cleveland Institute of Engineers, Middlesbrough, England.

Dansk Ingeniorforening, Amaliegade 38, Copenhagen, Denmark.

Detroit Engineering Society, 46 Grand River Avenue, West, Detroit, Mich.

Engineering Association of Nashville, Commercial Club Building, Nashville, Tenn.

Engineering Association of New South Wales, 5 Elizabeth Street, Sydney, New South Wales, Australia.

Engineering Societies Club of Hawaii, E. F. Cykler, Secretary, Honolulu, Hawaii.

Engineers and Architects Club of Louisville, 1412 Starks Building, Louisville, Ky.

Engineers' Club of Baltimore, 6 West Eager Street, Baltimore, Md.

Engineers' Club of Kansas City, Robert S. Beard, Secretary, Third Floor, City Hall, Kansas City, Mo.

Engineers' Club of Minneapolis, 17 South Sixth Street, Minneapolis, Minn.

Engineers' Club of Philadelphia, 1317 Spruce Street, Philadelphia, Pa.

Engineers' Club of St. Louis, 3817 Olive Street, St. Louis, Mo.

Engineers' Club of Toronto, 96 King Street, West, Toronto, Ont., Canada.

Engineers' Club of Trenton, Trent Theatre Building, 12 North Warren Street, Trenton, N. J.

Engineers' Society of Northeastern Pennsylvania, 415 Washington Avenue, Scranton, Pa.

Engineers' Society of Pennsylvania, 31 South Front Street, Harrisburg, Pa.

Engineers' Society of Western Pennsylvania, 568 Union Arcade Building, Pittsburgh, Pa.

Florida Engineering Society, J. R. Benton, Secretary, Gainesville, Fla.

Institute of Marine Engineers, The Minories, Tower Hill, London, E., England.

Institution of Civil Engineers, Great George Street, Westminster, S. W., London, England.

Institution of Engineers of the River Plate, Calle 25 de Mayo 195, Buenos Aires, Argentine Republic.

Institution of Naval Architects, 5 Adelphi Terrace, London, W. C., England.

Junior Institution of Engineers, 39 Victoria Street, Westminster, S. W., London, England.

Koninlijk Instituut van Ingenieurs, The Hague, The Netherlands.

Louisiana Engineering Society, State Museum Building, Chartres and St. Ann Streets, New Orleans, La.

Memphis Engineers' Club, Memphis, Tenn.

Midland Institute of Mining, Civil and Mechanical Engineers, Sheffield, England.

Montana Society of Engineers, Butte, Mont.

North of England Institute of Mining and Mechanical Engineers, Newcastle-upon-Tyne, England.

Oregon Society of Civil Engineers, Portland, Ore.

Pacific Northwest Society of Engineers, 803 Central Building, Seattle, Wash.

Rochester Engineering Society, Rochester, N. Y.

Sociedad Colombiana de Ingenieros, Bogota, Colombia.

Sociedad de Ingenieros del Peru, Lima, Peru.

Societe des Ingenieurs Civils de France, 19 rue Blanche, Paris, France.

Society of Engineers, 17 Victoria Street, Westminster, S. W., London, England.

Southwestern Society of Engineers, C. E. Barglebaugh, Secretary, 703 First National Bank Building, El Paso, Tex.

Svenska Teknologforeningen, Brunkebergstorg 18, Stockholm, Sweden.

Tekniske Forening, Vestre Boulevard 18–1, Copenhagen, Denmark.

Vermont Society of Engineers, George A. Reed, Secretary, Montpelier, Vt.

Western Society of Engineers, 1735 Monadnock Block, Chicago, Ill.

ACCESSIONS TO THE UNITED ENGINEERING SOCIETY LIBRARY

(From January 1st to February 1st, 1918)

DONATIONS*

The statements made in these notices are taken from the books themselves, and this Society is not responsible for them.

INTERIOR WIRING:

And Systems for Electric Light and Power Service; a Manual of Practice for Electrical Workers, Contractors, Architects and Schools. By Arthur L. Cook. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1917. 10 + 416 pp., 248 illus., 2 diagrams, 7 x 5 in., flexible cloth. $2.00.

There are many text-books, the author says, which deal with the principles of operation of electrical apparatus and the methods of calculating electrical circuits, but the usual electrical worker or student does not possess a sufficient background of practical experience to enable him to use these principles to design a wiring installation. In this book an attempt is made to supplement the text-books by giving information which will compensate, in part at least, for a lack of practical experience.

THEORY AND OPERATION OF DIRECT-CURRENT MACHINERY.

Prepared in the Extension Division of the University of Wisconsin. By Cyril M. Jansky. N. Y., McGraw-Hill Book Co., Inc.; Lond., Hill Publishing Co., Ltd., 1917. 10 + 285 pp., 214 illus., 9 x 6 in., cloth. $2.50.

A text-book prepared by the Extension Division of the University of Wisconsin for students of limited mathematical training. An elementary course in the principles involved, their applications in construction, and the operation and care of the machines.

HYDRO-ELECTRIC POWER STATIONS.

By Eric A. Lof and David B. Rushmore. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1917. 10 + 822 pp., 407 illus., 2 diagrams, 9 x 6 in., cloth. $6.00.

Treats of the hydraulic, electrical, and economic factors involved in the planning, construction, and operation of these plants, but does not deal with the design of the individual structures, machinery, and apparatus of which a power station is composed. The appendices give a bibliography of American hydro-electric stations and a table of the principal data on transmission systems operating at 70 000 volts or more. Contents: General Introduction; Hydrology; Classification of Developments; Dams and Headworks; Water Conductors and Accessories; Storage Reservoirs; Power-House Design; Hydraulic Equipment; Electrical Equipment; Economical Aspects; Organization and Operation; Appendix I, References to Descriptions of Plants; II, Principal Data on Transmission Systems Operating at 70 000 Volts and Above; III, Turbine Testing Code.

FUNDAMENTALS OF NAVAL SERVICE.

By Commander Yates Stirling. Special Chapters by Lt.-Commander H. C. Mustin, Lt.-Commander C. S. McDowell, and Dr. Ralph Walker McDowell. Phila. and Lond., J. B. Lippincott Co. (copyright 1917). 589 pp., 32 illus., 2 pl., 2 diagrams, 7 x 5 in., cloth. $2.00.

Epitomizes a variety of information, usually to be obtained only in many books, in the form of a manual for those interested in our navy, and who may choose to serve their country on the water.

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* Unless otherwise specified, books in this list have been donated by the publishers.

STEAM POWER PLANT ENGINEERING.

By George F. Gebhardt. 5th ed., rewritten and reset. N. Y., John Wiley and Sons, Inc.; Lond., Chapman and Hall, Ltd., 1917. 16 + 1057 pp., 642 illus., 1 diagram, 9 x 6 in., cloth. $4.00.

This edition follows the plan of the earlier ones, but has been greatly enlarged and entirely rewritten so as to include the modern developments of the steam power plant. Supplementary chapters on Elementary Thermodynamics, Properties of Steam, and Properties of Dry and Saturated Air, have been added.

FIRST REPORT TO THE COUNCIL OF THE NORTH EAST COAST INSTITUTION

Of Engineers and Shipbuilders on Certain Methods of Producing Vacuum. By Edwin L. Orde, C. Waldie Cairns and J. Morrow. Newcastle-upon-Tyne, North East Coast Institution of Engineers and Shipbuilders, 1916-17. 34 pp., 16 illus., 1 pl., tab., 12 x 9 in., paper. 10s. 6d.

Presents the results of a series of experiments on apparatus by which the air is withdrawn from the condenser by reciprocating air pumps and on that by which air is withdrawn from the condenser by fluid jets, by which it is compressed and delivered to the air pumps in a less rarefied state.

THE FLYER'S GUIDE;

An Elementary Handbook for Aviators. By Capt. N. J. Gill. N. Y., E. P. Dutton and Co., 1917. 153 pp., 18 illus., 3 pl., 9 x 6 in., cloth. $2.00.

Instructions to beginners on methods of flying, the construction and maintenance of air-planes, the theory of flight, internal combustion engines and ignition devices. Intended as a guide to those learning to fly, especially for military pilots.

THE EYES OF THE ARMY AND NAVY:

Practical Aviation. By Albert H. Munday. N. Y., & Lond., Harper & Bros. (copyright 1917). 226 pp., 49 illus., 4 pl., 7 x 5 in., cloth. $1.50.

A handbook intended for the layman with a moderate education who wishes to obtain a practical knowledge of flying and the fundamental principles of air-plane construction, engines, etc. Based on the writer's experience in the Royal Naval Air Service, as an aeroplane pilot.

SPHERICAL BALLOONING;

Some of the Requirements. By P. J. McCullough. St. Louis, The Mangan Printing Co. (copyright 1917). 46 pp., 11 illus., 9 x 6 in., paper. $1.00.

This monograph explains clearly and concisely the proper procedure in assembling and piloting spherical balloons. Intended as a primary text for beginners.

TEXT-BOOK OF ORDNANCE AND GUNNERY.

By Lt.-Col. William H. Tschappat. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1917. 10 + 705 pp., 314 illus., 1 diagram, 9 x 6 in., cloth. $6.50.

A text-book for the senior class at the U. S. Military Academy. Founded on Lissak's "Ordnance and Gunnery", with revisions and new material.

PRACTICAL INSTRUCTIONS

In the Search for, and the Determination of, the Useful Minerals, Including the Rare Ores; For the Prospector, Miner, and as a Ready Reference for Everybody Interested in the Mineral Industry. By Alexander McLeod. 2d ed., enl. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1917. 27 + 254 pp., 7 x 4 in., flexible cloth. $1.75.

This pocketbook of prospecting and testing includes simple tests which require no skill and only apparatus and chemicals which are easily obtainable. The second edition contains various additions and corrections, increasing it to three times the length of the first.

THE FOUNDATIONS OF NATIONAL PROSPERITY;

Studies in the Conservation of Permanent National Resources. By Richard T. Ely, Ralph H. Hess, Charles K. Leith, and Thomas Nixon Carver. N. Y., The Macmillan Co., 1917. 29 + 378 pp., 8 x 5 in., cloth. $2.00.

The title-page of this work emphasizes the thought that conservation is to be regarded as a treatment of the foundations of national prosperity. It deals with the permanent causes of the Wealth of Nations. The titanic war struggle in which we are engaged makes it important to emphasize the fact that in the treatment of conservation we are dealing with national preparedness both for war and peace. There is danger that in dealing with measures of preparedness we may direct our attention too exclusively to the needs of to-day and to-morrow, whereas nothing stands out more clearly as a result of our world war than the fact that preparedness must be a permanent, all-round condition; for otherwise our preparations may be in vain. Although it is true that this book deals mainly with permanent conditions of prosperity and preparedness, it also has lessons for the immediate present. Contents: Conservation and Economic Theory; Conservation and Economic Evolution; Conservation of Certain Mineral Resources; Conservation of Human Resources.

APPLIED MOTION STUDY:

A Collection of Papers on the Efficient Method to Industrial Preparedness. By Frank B. Gilbreth and L. M. Gilbreth. N. Y., Sturgis and Walton Co., 1917. 18 + 220 pp., 7 pl., 1 diagram, 8 x 5 in., cloth. $1.50.

In these articles which are here reprinted from various periodicals, the authors describe motion study as applied to various fields of activity, and outline its principles and practice so as to make possible its application in any and all lines of work. Contents: What Scientific Management Means to America's Industrial Position; Units, Methods, and Devices of Measurement under Scientific Management; Motion Study as an Industrial Opportunity; Motion Study and Time Study Instruments of Precision; Chronocyclegraph Motion Devices for Measuring Achievement; Motion Models: Their Use in the Transference of Experience and the Presentation of Comparative Results in Educational Methods; Motion Study for the Crippled Soldier; The Practice of Scientific Management; The Three Position Plan of Promotion; The Effect of Motion Study upon the Workers.

THE MICROSCOPE;

An Introduction to Microscopic Methods and to Histology. By Simon Henry Gage. 12 ed., rewritten. Ithaca, The Comstock Publishing Co., 1917. 9 + 472 pp., 253 illus., 9 x 6 in., cloth. $3.00.

This edition, the author states, has been more thoroughly revised than any of its predecessors, and includes those new developments in processes and apparatus that he has found helpful by personal tests. Micro-chemistry and metallography have been omitted from this edition as adequate special text-books on these subjects are now available.

BIOCHEMICAL CATALYSTS IN LIFE AND INDUSTRY;

Proteolytic Enzymes. By Jean Effront. Translated by Samuel C. Prescott, Assisted by Charles S. Venable. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1917. 11 + 752 pp., 9 x 6 in., cloth. $5.00.

A companion volume to the author's "Enzymes and Their Applications", limited to the proteolytic enzymes, or those which act as catalysts for nitrogenous substances. Presents our knowledge of the action of these substances and of their products and describes the application of enzymes to industry. Bibliographies accompany each chapter.

EVERYMAN'S CHEMISTRY;

The Chemist's Point of View and His Recent Work Told for the Layman. By Ellwood Hendrick. N. Y. and Lond., Harper Bros. (copyright 1917). 374 pp., 8 x 5 in., cloth. $2.00.

The author has attempted to produce a readable, easily understood account of modern chemistry, with special stress on its application in actual life, for the use of those without special chemical training. Particular attention is given to industrial chemistry and to the most recent developments of American chemical industry.

SOIL CONDITIONS AND PLANT GROWTH.

By Edward J. Russell. 3d ed. N. Y. and Lond., Longmans, Green and Co., 1917. 243 pp., 14 illus., 10 x 6 in., boards. $2.00.

This volume, which belongs to the series of "Monographs on Biochemistry" edited by R. H. A. Plimmer and F. G. Hopkins, is an attempt to give a concise account of our present knowledge of the soil as a medium for plant life. The third edition has been considerably altered throughout, to include recent progress, and a new chapter discussing the colloidal properties of the soil has been added. An extensive select bibliography is given.

AN INTRODUCTION TO THE STUDY OF LANDSCAPE DESIGN.

By Henry Vincent Hubbard and Theodora Kimball. N. Y., The Macmillan Co., 1917. 20 + 406 pp., 40 illus., 36 pl., 11 x 9 in., cloth. $6.00.

Written, the authors state, to present a general conception of landscape design which may enable a designer better to determine for himself the relations of the objects and ideas with which he is dealing and better to prepare and use in a decisive way, in the individual problems of his profession, the natural aptitudes and acquired knowledge which are the tools of his trade. Contains numerous foot-note references and a select bibliography.

THE KILN DRYING OF LUMBER:

A Practical and Theoretical Treatise. By Harry Donald Tiemann. Phila. and Lond., J. B. Lippincott Co. (copyright 1917). 9 + 316 pp., 54 illus., 1 diagram, 9 x 6 in., cloth. $4.00.

The author, who is in charge of the kiln-drying experiments of the U. S. Forest Service, describes the structure and properties of wood, the common practices in drying; how wood dries; the principles and methods of kiln drying; the effect of various methods of drying upon the strength of wood, etc. Intended to provide the best available information in systematic form.

STREET RAILWAY ACCOUNTING:

A Manual of Operating Practice for Electric Railways. By Irville Augustus May. N. Y., The Ronald Press Co., 1917. 20 + 454 pp., 212 illus., 9 x 6 in., ½ mor. $5.00.

An outline of the working methods developed and actually used by the accounting departments of certain large companies which are operated in accordance with the regulations of the Interstate Commerce Commission as given in its "System of Uniform Accounts for Electric Railways". The author is Vice-President of the American Electric Railway Accountants Association.

PRACTICAL STREET CONSTRUCTION;

Planning Streets and Designing and Constructing the Details of Street Surface, Subsurface and Supersurface Structures. By A. Prescott Folwell. Reprinted from a Series of Articles Which Appeared in *Municipal Journal* during 1916. N. Y., Municipal Journal and Engineer, 1916. 248 pp., 151 illus., 9 x 6 in., cloth. $2.00.

A discussion of street alignment, grade, and cross-section, the location of underground constructions and their surface appurtenances, and the other features of city streets, especially prepared for the use of city engineers. Contents: What Streets are Used for; Planning Street Alignments; Diagonal Thoroughfares; Planning Thoroughfares; Street Planning in Newark; Street Widths; Sidewalk Widths; Minor Residence Streets; Local and Elastic Streets; Philadelphia Elastic Streets; Street Cross-Section; Motor Tracks and Street Grades; Street Grades; Planning Grades; Grade at Intersection; Intersected Grades; Gutters; Sidewalks and Sidewalk Construction; Sidewalk Obstructions.

GENERAL ELECTRIC COMPANY'S MEDICAL SERVICE AND HOSPITAL.

Schenectady, N. Y., General Electric Co. Illus., 11 x 9 in., cloth binder.

A brief account of the methods by which this company cares for the health of its employes, accompanied by a collection of safety bulletins used throughout its plants for educating its workmen in the prevention of accidents.

LIGHTHOUSES AND LIGHTSHIPS OF THE UNITED STATES.

By George R. Putnam. N. Y. and Bost., Houghton, Mifflin Co.; Cambridge, The Riverside Press, 1917. 13 + 308 pp., 36 pl., 9 x 6 in., cloth. $2.00.

This is a record of lighthouse work in this country, and of the main facts as to the lighthouses of the world, together with some account of personal deeds of the light-keepers. The book is planned to give a general and non-technical description of lighthouses, especially of those in the United States, and a history of their development.

ROLL OF HONOR

A List of Members of the Society Who are Serving in the Army or Navy of the United States or Any of Its Allies.*

Abbot, Frederic V. Brig.-Gen., Corps of Engrs., N. A., Office, Chief of Engrs., U. S. A., Washington, D. C.

Abbott, Frederick William. Lt.-Col., British Army; Metropolitan Club, New York City.

Acher, A. H. Maj., Corps of Engrs., U. S. A.; Dist. Engr., Box 1809, Seattle, Wash.

Ackerman, Alexander S. 1st Lieut., Engr. R. C., 11 Francis St., Newport, R. I.

Ackerman, Arthur P. 1st Lieut., Engr. R. C., 33d Engrs.; Great Barrington, Mass.

Adams, Edward M. Maj., U. S. A., Care, The Adjutant-Gen., U. S. A., Washington, D. C.

Adams, Milton Jewell. Capt., Co. C, 114th Engrs., Camp Beauregard, Alexandria, La.

Adams, Raymond E. Capt., Q. M. R. C.; Asst. to the Q. M., S. E. D., Peoples Bldg., Charleston, S. C.

Albert, Frederick W. Maj., Engr. R. C., 33d Engrs.; 23 Isham St., Burlington, Vt.

Alden, Herbert C. 1st Lieut., C. A. C., N. G. U. S., Fort Schuyler, New York City.

Alexander, E. Porter. 1st Lieut., Engr. R. C., 509th Engrs., Fort Sam Houston, San Antonio, Tex.

Alexander, Kay. Maj., 2d in Command, 12th Canadian Ry. Troops, B. E. F., France.

Allen, Franklin R. Capt., Engr. R. C., 8th Co., E. R. O. T. C., Camp Lee, Va.

Allen, Herschel Heathcote. 1st Lieut., Engr. R. C., Towson, Md.

Allen, Ralph B. 1st Lieut., Co. B, 25th Engrs., Am. Exp. Force.

Allen, Walter Henry. Maj., Engr. R. C.; 1112 East Jefferson St., Bloomington, Ill.

Allen, Walter Hinds. Civ. Engr., U. S. N. (rank of Lt.-Commander); Public Works Officer, Naval Training Station, Great Lakes, Ill.

Allison, William F. Maj., Engr. R. C., Am. Exp. Force, France.

Altman, Frank S. Lieut., Engr. R. C., 23d Engrs., Atchison, Kans.

Altstaetter, F. W. Col., Corps of Engrs., U. S. A., U. S. Engr. Office, Grand Rapids, Mich.

Anderson, J. E. Maj., 212th Field Co., Royal Engrs., B. E. F., France.

Anderson, J. H. 1st Lieut., Engr. R. C., 1st Co., Camp American University, Washington, D. C.

* This list is made up from replies to a circular forwarded to members of the Society, and others, and is probably neither accurate nor complete. It is requested that the attention of the Secretary be called to any omissions or inaccuracies in order that they may be corrected in subsequent lists.

Anderson, W. P. Capt., Engr. R. C., 112th Engrs., Camp Sheridan, Ala.

Andrew, Clarence R. Capt., Engr. R. C., 23 Vernon Ave., Newport, R. I.

Andrews, Carl B. Capt., Engr. R. C. (*Unassigned*), 743 Wyllie St., Honolulu, Hawaii.

Andrews, J. H. M. Maj., Engr. R. C., 103d Engrs., Camp Hancock, Augusta, Ga.

Angas, Robert M. 1st Lieut., 106th Engrs., Camp Wheeler, Macon, Ga.

Applegarth, Gault. Capt., Engr. R. C., 23d Engrs., Care, War Dept., Washington, D. C.

Ardery, Edward Dahl. Col., Corps of Engrs., U. S. A., Am. Exp. Force.

Armitage, George W. Capt., Q. M. R. C.; Asst. to Dept. Q. M., Hawaiian Dept., Honolulu, Hawaii.

Arms, Leo M. 2d Lieut., Engr. R. C., 308th Engrs., Camp Sherman, Chillicothe, Ohio.

Armstrong, Charles Johnstone. Brig.-Gen.; Chf. Engr., H. Q., Canadian Army Corps, B. E. F., France.

Armstrong, Merwin. Capt., Engr. R. C., 105th Engrs., 30th Div., Camp Sevier, Greenville, S. C.

Arn, William G. Capt., Engr. R. C., 1st Bn., 13th U. S. Engrs. (Ry.), Am. Exp. Force, France.

Ashkins, Nathan Thomas. 1st Lieut., Engr. R. C., Lines of Communication, Eng. Headquarters, Am. Exp. Force, France.

Ashley, Carl. Capt., Engr. R. C., U. S. Military P. O. 702, France.

Ashmead, P. H. Maj., Engr. R. C.; 35 Nassau St., New York City.

Asplundh, E. T. Capt.; Supply Officer, 103d Engrs., 28th Div., Camp Hancock, Augusta, Ga.

Atterbury, W. W. Brig.-Gen.; Director of Transportation, Am. Exp. Force, France.

Atwood, William G. Maj., 17th Engrs. (Ry.), Am. Exp. Force, France, Care, Adjt. Gen., Washington, D. C.

Austill, Hurieosco. Capt., Engr. R. C., Co. D, 501st Engrs. Service Bn., Am. Exp. Force.

Ayres, Quincy C. 2d Lieut., Engr. R. C., 1022 Vermont Ave., N. W., Washington, D. C.

Babbitt, Harold E. Capt., Engr. R. C., Care, Adjutant-Gen., U. S. A., Washington, D. C.

Baffrey, Charles R. Capt., 102d Reg. d'Artillerie (French Army), Secteur Postal 160, B. C. M., Paris, France.

Bailey, Lewis P. Capt., Engr. R. C., Co. A, 304th Engrs., Camp Meade, Baltimore, Md.

Bailhache, John G. 2d Lieut., Engr. R. C., Vancouver Barracks, Vancouver, Wash.

Bakenhus, R. E. Civ. Engr., U. S. N. (rank of Commander), Bureau of Yards and Docks, Washington, D. C.

Baker, H. S. Lt.-Col., Engr. R. C., 111th Engrs., Camp Bowie, Fort Worth, Tex.

Baker, Shirley. Capt., Engr. R. C., Co. B, 23d Engrs., Camp Meade, Md.

Balch, William H. Capt., Engr. R. C., Camp American University, Washington, D. C.

Bandy, Edward L. 1st Lieut., Engr. R. C., Camp American University, Washington, D. C.

Barber, Charles W. Private, 38th Engrs.; 3428 Brown St., N. W., Washington, D. C.

Barber, Justin F. Private, 23d Engrs., Camp Meade, Md.

Barber, Norman N. 1st Lieut., Engr. R. C., 6th Engrs., Am. Exp. Force, France.

Barclay, A. J. 1st Lieut., Engr. R. C., Fort Leavenworth, Kans.

Barney, Samuel E. Maj., Engr. R. C. (*Unassigned*), 346 Whitney Ave., New Haven, Conn.

Barstow, Eugene Duston. 1st Lieut., Engr. R. C. (*Unassigned*), Cuyahoga Falls, Ohio.

Bartholomew, B. W. Lieut., Engr. R. C., 301st Engrs., Camp Devens, Ayer, Mass.

Battie, H. S. 1st Lieut., Engr. R. C., 1st Co., Fort Leavenworth, Kans.

Baxter, O. G. Capt., Engr. R. C., Camp Pike, Little Rock, Ark.

Bayliss, Paul. 2d Lieut., Engr. R. C., 8th Engrs. (Mounted), Camp Baker, Fort Bliss, Tex.

Beach, Lansing H. Col., Corps of Engrs., U. S. A., 412 Custom House, Cincinnati, Ohio.

Beal, Pendleton. Private, Headquarters Co., 165th U. S. Infantry, 83d Brigade, 42d Div.

Bebb, Edward C. Capt., Engr. R. C., U. S. Geological Survey, Washington, D. C.

Beeman, Thomas R. Capt., Engr. R. C., Am. Exp. Force, France.

Beerbower, Dumont. 1st Lieut., Engr. R. C.; Asst. Instr., Co. 1, Camp Lee, Petersburg, Va.

Begg, R. B. H. Capt., Engr. R. C., Am. Exp. Force, France.

Behrman, I. E. 1st Lieut., Engr. R. C., Care, C. E. O., Zone of the Advance, Am. Exp. Force, France.

Belknap, Francis W. Engr. R. C., U. S. Army P. O. 705, Am. Exp. Force, France.

Bell, George Edward. Lieut., Canadian Engrs., Care, Bank of Montreal, Waterloo Pl., London, S. W., England.

Bellinger, L. F. Civ. Engr., U. S. N. (rank of Commander), U. S. Navy Yard, Bremerton, Wash.

Belzner, Theodore. 1st Lieut., Engr. R. C., Co. 1, Camp Lee, Petersburg, Va.

Benham, Claude Gilbert. Capt., C. A. R. C., U. S. A., Fort Monroe, Va.

Benham, W. L. Maj., Q. M. R. C.; Engr. Officer in Chg. of Camp Utilities, Camp Funston, Fort Riley, Kans.

Bennison, Ernest William. 1st Lieut., Engr. R. C., Fort Leavenworth, Kans.

Bensel, J. A. Maj., Engr. R. C., Engr. Depot, Norfolk, Va.

Benson, Orville. Maj., Engr. R. C., Headquarters, Am. Exp. Force, France.

Berdeau, Ray W. Capt., Engr. R. C., Co. B, 17th Engrs., Camp Gordon, Atlanta, Ga.

Betts, Clifford A. 1st Lieut., C. A. R. C., Am. Exp. Force, France.

Biddle, John. Maj.-Gen., Corps of Engrs., U. S. A.; Asst. Chf. of Staff, U. S. A., War Dept., Washington, D. C.

Billings, A. W. K. Lt.-Commander, Care, Commander, U. S. Naval Aviation Forces, Paris, France.

Billings, Fred M. Capt., Engr. R. C., Camp Lee, Petersburg, Va.

Binckley, George Sydney. Maj., Engr. R. C., 112th Engrs., Montgomery, Ala.

Binger, Walter D. 2d Lieut., Sig. C. R. C.; 280 Madison Ave., New York City.

Birdseye, Claude H. Maj., Coast Artillery Brigade, Am. Exp. Force, France.

Bishop, Roy P. 2d Lieut., Engr. R. C. (*Unassigned*), Oelwein, Iowa.

Bither, T. A. Lieut., Sig. R. C., A. S., Aviation School, San Diego, Cal.

Bixby, William H. Brig.-Gen., U. S. A. (*Retired*), 428 Customhouse, St. Louis, Mo.

Black, Dudley F. Capt., Engr. R. C.; 509 Tramway Bldg., Denver, Colo.

Black, G. G. Capt., Engr. R. C.; Acting Adjutant, 314th Engrs., Camp Funston, Junction City, Kans.

Black, James B. 1st Lieut., Engr. R. C., Chf. Engr.'s Office, Headquarters, Am. Exp. Force, France.

Black, Roger Derby. Lt.-Col., Corps of Engrs., U. S. A., Headquarters, Am. Exp. Force.

Black, R. P. 1st Lieut., Engr. R. C., Camp Lee, Petersburg, Va.

Black, William M. Brig.-Gen.; Chf. of Engrs., U. S. A., War Dept., Washington, D. C.

Blackman, J. W. B. Lieut., Canadian Ry. Troops, Canadian Expeditionary Force.

Blair, McCrea Parker. Capt., No. 1 Depot Bn., Manitoba Reg., Winnipeg, Man., Canada.

Blanchard, Murray. Maj., Engr. R. C., 111th Engrs., Camp Bowie, Fort Worth, Tex.

Boes, Frank C. Capt., Engr. R. C. (*Unassigned*), 244 Larkin St., Buffalo, N. Y.

Boesch, Clarence E. Capt., 105th Engrs., Camp Sevier, Greenville, S. C.

Boggs, F. C. Col., 315th Engrs., N. A., Camp Travis, San Antonio, Tex.

Boland, Charles J. 1st Lieut., Sig. C., U. S. A.; 228 Eighth St., Troy, N. Y.

Bolin, Harry W. Sergeant, Co. E, 23d Engrs., Camp Meade, Annapolis Junction, Md.

Bond, P. S. Col., 107th Engrs.; Div. Engr., 32d Div., Am. Exp. Force, France.

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Spear, Walter E. Maj., Q. M. R. C., in Chg. of Utilities, Camp Upton, N. Y.

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Steinberg, Max. 1st Lieut., U. S. R., U. S. Coast and Geodetic Survey, Washington, D. C.

Stem, Clifford H. 2d Lieut., Engr. R. C., Am. Exp. Force, France.

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Storey, Franklin S. 1st Lieut., Engr. R. C., Am. Exp. Force, France.

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Strehan, George E. 2d Lieut., Artillery, Camp Meade, Md.

Street, J. Z. Private, Co. E., 308th Engrs., Camp Sherman, Chillicothe, Ohio.

Strickler, F. W. Capt., Engr. R. C. (*Unassigned*); Dist. Engr., Erie R. R. Co., Room 301, K. of C. Bldg., Youngstown, Ohio.

Strickler, G. B. Maj., Engr. R. C.; Const. Q. M., Baltimore Depot Warehouses, Baltimore, Md.

Strickler, T. J. Capt., Engr. R. C., 3428 Campbell St., Kansas City, Mo.

Stroebe, George G. Capt., N. A., Manila, Philippine Islands.

Stupp, John G. 1st Lieut., Ord. R. C.; Res., 1837 Kalorama Rd., Washington, D. C.

Sturtevant, C. W. Lt.-Col., 15th U. S. Engrs., Am. Exp. Force, France.

Summers, R. E. J. 1st Lieut., Engr. R. C., Co. F, 16th U. S. Engrs. (Ry.), Am. Exp. Force.

Suter, Russell. Capt., Engr. R. C., Am. Exp. Force, France.

Sutton, Frank. Maj., Engr. R. C., 29th Engrs., Camp Devens, Ayer, Mass.

Swaren, J. W. Capt., Engr. R. C., E. R. O. T. C., Camp Lee, Petersburg, Va.

Swartz, Leon. Master Engr., 15th U. S. Engrs., Am. Exp. Force, France.

Sweeney, Harry C. Capt., Q. M. R. C.; Const. Q. M., 1723 F St., Washington, D. C.

Sweetser, C. H. Capt., Engr. R. C., 41st Engrs., Care, U. S. Office of Public Roads and Rural Eng., Washington, D. C.

Sykes, George. Capt., Engr. R. C. (*Unattached*), Am. Exp. Force, France.

Tainter, F. S. Maj., Engr. R. C., 60 Wall St., New York City.

Tate, R. L. 1st Lieut., Engr. R. C., 303d Engrs., Camp Dix, Wrightstown, N. J.

Tay, S. W. Lieut., U. S. N. N. V., U. S. S. *Wenonah*, Care, Postmaster, New York City.

Taylor, Arthur. 1st Lieut., Engr. R. C., E. R. O. T. S., Camp Lee, Petersburg, Va.

Taylor, Edwin A. Maj., Engr. R. C., Camp Lee, Petersburg, Va.

Taylor, Harry. Brig.-Gen., N. A.; Chf. Engr., Am. Exp. Force, France.

Taylor, Henry. Capt., Engr. R. C., 304th Engrs., Camp Meade, Baltimore, Md.

Taylor, Nelson. Lieut., U. S. N., U. S. S. *Bridgeport,* Care, Postmaster, New York City.

Taylor, P. M. 2d Lieut., R. E., 237th Field Co., B. E. F., Italy.

Taylor, Seneca V. Capt., C. A. R. C., U. S. A., Coast Defenses, Portland, Me.

Taylor, William T. Capt., Royal Flying Corps, B. E. F., France.

Taylor, Wyllys H. Capt., Engr. R. C., 306th Engrs., N. A. (81st Div.), Camp Jackson, Columbia, S. C.

Ten Hagen, Henry. 2d Lieut., Engr. R. C., 303d Engrs., Camp Dix, Wrightstown, N. J.

Tenney, Willis R. Capt., Engr., R. C., Headquarters, Am. Exp. Force, France.

Thomas, Charles D. Capt., Engr. R. C., Co. B, 507th Engrs., Camp Travis, San Antonio, Tex.

Thomas, W. E. Capt., San. Corps, Charlotte, N. C.

Thompson, Sanford E. Maj., Engr. R. C., Progress Section, Office of Chf. of Ordnance, Washington, D. C.

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Thurber, Clinton D. Civ. Engr., U. S. N. (rank of Lt.-Commander), Bureau of Yards and Docks, Washington, D. C.

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Tilden, Charles Joseph. Capt., Engr. R. C. (*Unassigned*), Care, Johns Hopkins Univ., Baltimore, Md.

Tinsley, R. B. Capt., Engr. R. C. (*Unassigned*); Big Stone Gap, Va.

Todd, Frank Herbert. Maj., Q. M. R. C., in Chg. of Utilities, Camp Travis, San Antonio, Tex.

Todd, Oliver J. Capt. and Adjt., Engr. R. C., 3d Bn., 20th Engrs., Camp American University, Washington, D. C.

Tolles, F. C. 1st Lieut., Engr. R. C., 112th Engrs., Camp Sheridan, Montgomery, Ala.

Topping, Perry. Capt., Engr. R. C., Fort Leavenworth, Kans.

Torrance, William M. Capt., Engr. R. C.; Asst. to Const. Q. M., Raritan River Ordnance Depot, Metuchen, N. J.

Townsend, C. McD. Col., Corps of Engrs., U. S. A., 12th Engrs. (Ry.), Am. Exp. Force, France.

Trout, Alex Linn. Capt., Engr. R. C., 2d Co., Fort Leavenworth, Kans.

True, Albert O. Capt., Engr. R. C. (*Unassigned*), High St., Rensselaer, N. Y.

Trueblood, P. McG. Lieut., U. S. N. R. F., Navy Yard, Boston, Mass.

Tucker, H. F. Ensign, U. S. N. R. F., Seattle Construction & Dry Dock Co., Seattle, Wash.

Turley, Jay. Capt., Engr. R. C., Special Staff Service (Abroad), Am. Exp. Force, France.

Turner, Daniel Norman. 2d Lieut., Engr. R. C., 304th Engrs., Camp Meade, Baltimore, Md.

Turner, Nathaniel Parker. Capt.; Topographical Officer, 111th Engrs., Camp Bowie, Fort Worth, Tex.

Tuska, Gustave R. Maj., Engr. R. C., 68 William St., New York City.

Tyson, William C. Capt., Engr. R. C., 6th Co., Fort Leavenworth, Kans.

Uhler, W. D. Maj., Q. M. C., N. A.; Chf. Engr., Pennsylvania State Highway Dept., Harrisburg, Pa.

Van Buren, Maurice Pelham. 2d Lieut., Corps of Engrs., U. S. A., New Brighton, N. Y.

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Van Zile, Harry Lee. Maj., Engr. R. C., Am. Exp. Force, France.

Vaughan, Henry F. Capt., San. Corps, 1st, Camp Travis, San Antonio, Tex.

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von Deesten, A. P. Capt., Corps of Engrs., U. S. A., Co. F, 5th Engrs., Corpus Christi, Tex.

Wade, George W. 1st Lieut., Co. D, 2d Bn., 117th Engrs., 42d Div., Am. Exp. Force, France.

Wadsworth, George R. Maj., Signal Corps, U. S. A.; Chf. Engr., Naval Aircraft Factory, Navy Yard, Philadelphia, Pa.

Wadsworth, Henry H. Maj., Engr. R. C. (*Unassigned*), 405 Custom House, San Francisco, Cal.

Wagner, John, Jr. 1st Lieut., Cavalry, U. S. R., Am. Exp. Force.

Waite, Clement F. 2d Lieut., Engr. R. C., Vancouver Barracks, Vancouver, Wash.

Waldron, Albert E. Col., 35th Engrs., U. S. A., Am. Exp. Force, France.

Walker, Edward G. Lieut., Royal N. V. R., 78 Cheyne Court, Chelsea, London, S. W. 3, England.

Walker, Elton D. Capt., Engr. R. C., Co. A, 5th U. S. Engrs., Am. Exp. Force, France.

Walker, Harry Bruce. Capt., Engr. R. C.; Asst. to Div. Engr., 78th Div., N. A., Camp Dix, Wrightstown, N. J.

Walker, Meriwether Lewis. Col., Corps of Engrs., U. S. A., 116th Engrs., 41st Div.

Walker, W. Kemp. Capt., Engr. R. C., Camp Lee, Petersburg, Va.

Wallace, David A. 1st Lieut., Engr. R. C., 311th Engrs., Camp Grant, Rockford, Ill.

Waller, Percy. Capt., Engr. R. C., Camp Lee, Petersburg, Va.

Walton, H. B. Capt., Engr. R. C., 312th Engrs., Camp Pike, Little Rock, Ark.

Ward, George S. 2d Lieut., Engr. R. C., Co. A, 117th Engrs., Am. Exp. Force, France.

Ward, Jasper D. Corporal, Co. C, 55th Inf., Chickamauga Park, Chattanooga, Tenn.

Ward, Lyman Wise. Capt., C. A., R. C., 5th Co., Fort Warden, Wash.

Ware, John. 1st Lieut., Co. A, 101st Engrs., Am. Exp. Force, France.

Ware, Norton. Capt., Engr. R. C., Vancouver Barracks, Vancouver, Wash.

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Waring, C. T. Maj., Sig. R. C., Constr. Div., Langley Field, Hampton, Va.

Warner, Elwin S. Capt., Engr. R. C., Co. B, 301st Engrs., Camp Devens, Ayer, Mass.

Warren, James G. Col., Corps of Engrs., U. S. A., 540 Federal Bldg., Buffalo, N. Y.

Warren, Minton M. 1st Lieut., Engr. R. C., Headquarters Co., 101st Engrs., 51st Brigade, 26th Div., Am. Exp. Force, France.

Warren, Philip R. Lieut., Royal Engrs., Care, Sports Club, St. James Sq., London, W., England.

Washington, W. O. Capt., Engr. R. C. (*Unassigned*), San Antonio, Tex.

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Watson, D. M. Lieut., M. T., A. S. C., 100th Siege Battery, R. G. A., B. E. F., France.

Watson, George L. Capt., Engr. R. C., Co. B, 30th U. S. Engrs., Headquarters, Washington, D. C.

Watson, Winslow B. Lieut., Co. C, 7th N. Y. Inf. (114th), Camp Wadsworth, Spartanburg, S. C.

Waugh, William H. Capt., Engr. R. C.; Pres. and Engr. Officer, Alaska Road Comm. and Senior Highway Engr., Office of Public Roads and Rural Eng., Juneau, Alaska.

Way, W. F. Sergeant, Co. D, 18th Engrs. (Ry.), U. S. Army Post Office No. 705, Am. Exp. Force, France.

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Whitney, Ralph Edward. 1st Lieut., San. Corps, N. A., San. Insp.'s Office, Camp Lewis, American Lake, Wash.

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Wickersham, John H. Capt., Engr. R. C., Engr. Office, P. O. 702, Am. Exp. Force, France.

Wiggin, Thomas H. Capt., Engr. R. C., Care, Gen. Taylor, Am. Exp. Force, France.

Wild, H. J. Capt., Engr. R. C., 3d Engrs., Corozal, Canal Zone, Panama.

Wilgus, W. J. Col., Engrs., N. A., Am. Exp. Force, France.

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Willard, N. R. Capt., Engr. R. C., 304th Engrs., Camp Meade, Md.

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Williams, Gardner S. Maj., Engr. R. C., Camp Beauregard, Alexandria, La.

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Woodle, Bernon Tisdale. Capt., 305th Engrs., Care, Depot Engr., Coca Cola Bldg., Baltimore, Md.

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Yost, Howard McC. Capt., Engr. R. C., 2030 F St., N. W., Washington, D. C.

Young, Samuel M. Capt., Engr. R. C. (*Unassigned*), 635 Common St., New Orleans, La.

Zinn, George A. Col., Corps of Engrs., U. S. A., 321 Custom House, Portland, Ore.

MEMBERSHIP

(From January 4th to February 7th, 1918)

ADDITIONS

MEMBERS

		Date of Membership.
BELLAMY, HERBERT ERNEST. Officer in Chg., Flinders Naval Base, Crib Point, Victoria, Australia	Assoc. M.	Oct. 3, 1911
	M.	Oct. 9, 1917
CARR, OSSIAN ELMER. City Mgr., 558 Fifth St., Niagara Falls, N. Y.		Jan. 14, 1918
COPE, ERLE LONG. Cons. Engr., First National Bank Bldg., San Francisco, Cal.	Jun.	Jan. 7, 1908
	Assoc. M.	Dec. 6, 1910
	M.	Nov. 27, 1917
KNUTSON, GEORGE HENRY. Civ. and Hydr. Engr. (Fargo Eng. Co.), 304 Commonwealth Bldg., Jackson, Mich.	Jun.	Aug. 31, 1909
	Assoc. M.	Mar. 14, 1916
	M.	Jan. 14, 1918
LEA, WILLIAM SCHURMAN. Cons. Engr. (R. S. & W. S. Lea), 809 New Birks Bldg., Montreal, Que., Canada.		Jan. 14, 1918
MERCIER, PAUL EMILE. Chf. Engr. and City Surv., City Hall, Montreal, Que., Canada		Nov. 27, 1917
RUSCH, HENRI. Chf. Engr., Bldg. Dept., City of St. Louis, 6038 Delmar Boulevard, St. Louis, Mo	Assoc. M.	Nov. 8, 1909
	M.	Jan. 14, 1918
SHOECRAFT, EZRA COLLIN. City Engr., Flint, Mich	Assoc. M.	Sept. 6, 1910
	M.	Jan. 14, 1918
SMITH, RUSSELL BIDDLE. Cons. and Superv. Engr., 50 East 42d St., New York City	Assoc. M.	May 6, 1908
	M.	Jan. 14, 1918
SMULSKI, EDWARD. Cons. Engr. (S. M. I. Eng. Co.), 13 Park Row, New York City	Assoc. M.	Feb. 4, 1913
	M.	Jan. 14, 1918
TERRY, ALFRED HOWE. Penfield Rd., Fairfield, Conn.	Assoc. M.	June 6, 1906
	M.	Jan. 14, 1918
TRELEASE, FRANK JOHNSON. Engr. in Executive Chg., Ford, Bacon & Davis, 921 Canal St., New Orleans, La.	Jun.	May 3, 1910
	Assoc. M.	April 2, 1913
	M.	Jan. 14, 1918
VITERBO, LIONEL RENE. Pres., Reinforced Concrete Co. of St. Louis, 918 Wright Bldg., St. Louis, Mo.		Jan. 14, 1918

ASSOCIATE MEMBERS

ALEXANDER, ALEXANDER. Estimator and Asst. to W. S. Hamell, 2160 Thirteenth St., Troy, N. Y.	Jan. 14, 1918
ALMY, EDWARD TABER, JR. Res. Engr., Sinclair Refining Co., Box 7, Packers Station, Kansas City, Kans.	Jan. 14, 1918
BESSEY, ROY FREDERIC. With U. S. Navy Dept., Bureau of Yards and Docks, 1219 Shepherd St., N. W., Washington, D. C.	Jan. 14, 1918

ASSOCIATE MEMBERS (*Continued*)

		Date of Membership.
BRANDT, RICHARD LUDWIG. Structural Engr., Alamo Iron Works, 226 Goliad St., San Antonio, Tex		Jan. 14, 1918
BROWN, WILLIAM EDWARD. Chf. Draftsman, Dept. of Public Works, Box 173, Santo Domingo, Dominican Republic		Nov. 27, 1917
CARPENTER, JOHN SCHRODER. Chf. Draftsman, James Leffel & Co., Springfield, Ohio		Jan. 14, 1918
DREYFUS, SAMUEL CELLNER. Supt. of Constr. and Engr., R. M. Hudson Co., Camp Jackson, Columbia, S. C	Jun. Assoc. M.	June 3, 1915 Jan. 14, 1918
DRURY, WILLIAM FISHER. Prin. Asst. Engr., Central Maine Power Co., 4 Greylock, Waterville, Me	Jun. Assoc. M.	Mar. 4, 1913 Nov. 27, 1917
EDGAR, WILLIAM CLANEY. Erecting Engr., H. Koppers Co., Union Arcade, Pittsburgh, Pa		Jan. 14, 1918
ESTES, LEWIS ALDEN. Sales Engr. and Mgr., Boston Office, Trussed Concrete Steel Co., 146 Summer St., Boston, Mass	Jun. Assoc. M.	June 30, 1911 Jan. 14, 1918
FRISSELL, LAURENCE EMERSON. 506 South 8th Ave., Mount Vernon, N. Y		Jan. 14, 1918
GALT, CHARLES ELIJAH. N. E. Cor. Gore and Swon Aves., Webster Groves, Mo		Nov. 27, 1917
GAUTIER, RAOUL CHARLES RODOLPHE. Chf. Engr., Thompson & Binger, Inc., 280 Madison Ave., New York City		Sept. 11, 1917
GIFFELS, WILLIAM CHARLES. 1st Lieut., Engrs., U. S. R., Co. A, 310th Engrs., Camp Custer, Battle Creek, Mich	Jun. Assoc. M.	June 24, 1914 Sept. 11, 1917
HARTGERING, JOHN MCRAE. Associated with Clarence W. Hubbell, 2348 Penobscot Bldg., Detroit, Mich		Jan. 14, 1918
HUMAN, THEODORE, JR. Engr. in Chg., Plantations and Constr., Atlantic Fruit Co., Cayo Mambi, Oriente, Cuba		Jan. 14, 1918
JACOBI, EMIL FREDERIC. Structural Engr., The Babcock & Wilcox Co., 109 Newman Ave., Bayonne, N. J		Jan. 14, 1918
JOHNSON, FRANK MELVIN S. Capt., Corps of Engrs., U. S. A., 4th Div., 4th Engrs., Camp Greene, Charlotte, N. C	Jun. Assoc. M.	Jan. 31, 1911 Jan. 14, 1918
KEMMERER, JOHN MARTIN. Co. 5, E. R. O. T. C., Camp Lee, Petersburg, Va.; 1222 East 53d St., Chicago, Ill.		Jan. 14, 1918
LA RUE, HARRY ANDERSON. Engr., Road Bureau, Portland Cement Assoc., 335 Rialto Bldg., Kansas City, Mo		Nov. 27, 1917
MCMILLAN, W. BRUCE. 1st Lieut., Engrs., U. S. R., Am. Exp. Forces, France	Jun. Assoc. M.	Jan. 7, 1913 Jan. 14, 1918
MCPHERSON, ALBERT MORTIMER. Gen. Supt., Delta Land & Water Co., Milford, Utah		Jan. 14, 1918

ASSOCIATE MEMBERS (*Continued*)

	Date of Membership.
MATHIAS, JARED LEROY. Junior Highway Engr., U. S. Office of Public Roads, Mills Bldg., San Francisco, Cal. (Jun. / Assoc. M.)	Oct. 1, 1913 / Jan. 14, 1918
MITCHELL, WILLIAM MONTGOMERY. Asst. Supt., Flint City Water-Works, 618 Church St., Flint, Mich.	Jan. 14, 1918
NEEDHAM, EGBERT STEPHEN. 109 North 5th St., Livingston, Mont.	Nov. 27, 1917
OPENSHAW, JOHN EDWARD. Cost Engr., Dominion Bridge Co., Ltd., Montreal, Que., Canada.	Jan. 14, 1918
PASCO, BENJAMIN GILBERT. Woods Supt., A. J. Neimeyer Lumber Co., Little Rock, Ark.	Jan. 14, 1918
PETRY, CHARLES ALOYSIUS. Designer and Supt. of Constr., Superv. Archt.'s Office, Univ. of Illinois, 256 Administration Bldg., Urbana, Ill.	Nov. 27, 1917
PEYTON, ASHTON RAMSAY. Contr. Engr., Virginia Bridge & Iron Co., 503 First National Bank Bldg., Denver, Colo.	Jan. 14, 1918
RUSSELL, EARLE. Contr. Engr. (Ellison & Russell), 251 Kearny St., San Francisco, Cal.	Jan. 14, 1918
SCHLICK, WILLIAM JAPHIA. Drainage Engr., Eng. Experiment Station, Iowa State Coll., 717 Seventh St., Ames, Iowa.	Jan. 14, 1918
STEVENSON, MARKLEY. Sales Agt., The General Crushed Stone Co., 204 Cutler Bldg., Rochester, N. Y.	Sept. 11, 1917
STOCKBRIDGE, DAVID FIELD. Engr. in Chg., Designs and Plans, Capitol Steel & Iron Co., R. F. D. No. 1, Oklahoma, Okla.	Jan. 14, 1918
SWEETSER, ERNEST OSGOOD, Capt., Engrs., U. S. R. (*Unattached*), Am. Exp. Forces, France.	Nov. 27, 1917
SYKES, GAITHER HUNTER. Howard House, Elkton, Md.	Jan. 14, 1918
SYKES, JAMES. Engr., G. W. Ry., P. O. Box 395, Loveland, Colo.	Jan. 14, 1918
VOLK, WENDELL DOUGLAS. 1st Lieut., Engrs. U. S. R., Co. E, 20th Engrs., Am. Exp. Forces, France.	Sept. 11, 1917
VOSS, WALTER CHARLES. Head, Dept. of Architectural Constr., Wentworth Inst., 22 Garrison Rd., Brookline, Mass.	Jan. 14, 1918
WADE, JEPTHA A. Field Engr., British Chemical Co., Hotel York, New York City.	Nov. 27, 1917
WHEELER, HENRY LEWIS. Superv. of Roadway and Structures, San Joaquin & Eastern R. R., Auberry, Cal.	Jan. 14, 1918
WHITE, FRANK OSMOND. 200 Fifth Ave., New York City.	Jan. 14, 1918

JUNIORS

CLECKNER, FREDERICK MARTIN. 1530 Green St., Harrisburg, Pa.	Jan. 14, 1918

JUNIORS (*Continued*)

	Date of Membership.
DARLING, CLINTON STOWELL. 2d Lieut., Co. A, 108th Engrs., Camp Logan, Houston, Tex.; Box 144, South Vernon, Mass.	Jan. 14, 1918
ELLIOTT, PERCIVAL. Care, Valuation Dept., N. & W. Ry., Roanoke, Va.	Jan. 14, 1918
FICKES, EUGENE WELDON. 533 East Orange St., Lancaster, Pa.	Sept. 11, 1917
FOGERTY, MERTON SHUMWAY. Engr. and Draftsman, Odell Mfg. Co., Box 493, Groveton, N. H.	Oct. 9, 1917
HUMANN, EDWIN AUGUST. Co. D, 4th Engrs. U. S. A., Camp Greene, Charlotte, N. C.; 811 First National Bank Bldg., Oakland, Cal.	Nov. 27, 1917
JEWELL, ALBERT HARTWELL. 1st Lieut., Sig. Corps, Aviation School, Post Hospital, Mount Clemens, Mich.; Address, 313 Clinton St., Adrian, Mich.	Jan. 14, 1918
LARKIN, CHARLES RAYMOND. Asst. Engr., Bureau of Health, 2242 West Lehigh Ave., Philadelphia, Pa.	Jan. 14, 1918
LEVY, JOSEPH IRWIN. 679 Ave. C, Bayonne, N. J.	Nov. 27, 1917
PRESTON, JOHN OWINGS. 501 Arlington Bldg., Rochester, N. Y.	Jan. 14, 1918

REINSTATEMENTS

ASSOCIATE MEMBERS

	Date of Reinstatement.
GEHRING, HERBERT AUGUST	Jan. 14, 1918

RESIGNATIONS

MEMBERS

	Date of Resignation.
BURGER, WILLIAM HENRY	Dec. 31. 1917
FENDALL, BENJAMIN TRUMAN	Dec. 31, 1917
STONE, EVERETT EDWARD	Dec. 31, 1917

ASSOCIATE MEMBERS

BROWN, SAMUEL COUGHLIN	Dec. 31, 1917
COLTMAN, ROBERT, JR.	Dec. 31, 1917
DAVIS, FRED RUFUS	Dec. 31, 1917
DECKER, FRANK WARWICK	Dec. 31, 1917
FRASER, DE GENNES	Dec. 31, 1917
FUQUA, PAUL DAVID	Dec. 31, 1917
MOORE, WALTER SMYTH	Dec. 31, 1917
RIGGS, CHARLES ALBERT	Dec. 31, 1917

JUNIORS

HARRINGTON, WELLESLEY CARL	Dec. 31, 1917
HENES, HARRY WILLIAM	Dec. 31, 1917
PARSONS, MAURICE GIESY	Dec. 31, 1917
TRUESDELL, ARCHIE MERLE	Dec. 31, 1917

DEATHS

BRADFORD, WILLIAM. Elected Member, December 7th, 1898; died November 23d, 1917.

CANNEY, JAY CASSIUS. Elected Junior, May 31st, 1916; died September 15th, 1917.

CURRAN, THOMAS FRANCIS. Elected Associate Member, August 31st, 1915; died January 8th, 1918.

HAGUE, WILLIAM. Elected Associate Member, October 4th, 1910; died January 1st, 1918.

Total Membership of the Society, February 7th, 1918, 8 612.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

(October 1st to 31st, 1917)

NOTE.—*This list is published for the purpose of placing before the members of this Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS

In the subjoined list of articles, references are given by the number prefixed to each journal in this list:

(2) *Journal*, Engrs. Club of Phila., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Chicago, Ill., 50c.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *Journal*, Am. Inst. Architects, Washington, D. C., 50c.
(7) *Gesundheits Ingenieur*, München, Germany.
(8) *Stevens Indicator*, Hoboken, N. J., 50c.
(9) *Industrial Management*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, 432 Fourth Ave., New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News-Record*, New York City, 15c.
(15) *Railway Age*, New York City, 15c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Electric Railway Journal*, New York City, 10c.
(18) *Railway Review*, Chicago, Ill., 15c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 20c.
(21) *Railway Engineer*, London, England, 1s. 2d.
(22) *Iron and Coal Trades Review*, London, England, 6d.
(23) *Railway Gazette*, London, England, 6d.
(24) *American Gas Engineering Journal*, New York City, 10c.
(25) *Railway Mechanical Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England, 4d.
(27) *Electrical World*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, Mass., $1.
(29) *Journal*, Royal Society of Arts, London, England, 6d.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium, 4 fr.
(31) *Annales* de l'Assoc. des Ing. Sortis des Ecoles Spéciales de Gand, Brussels, Belgium, 4 fr.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France, 1 fr.
(34) *Portefeuille Economiques des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *Cornell Civil Engineer*, Ithaca, N. Y.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Technisches Gemeindeblatt*, Berlin, Germany, 0, 70m.
(40) *Zentralblatt der Bauverwaltung*, Berlin, Germany, 60 pfg.
(41) *Electrotechnische Zeitschrift*, Berlin, Germany.
(42) *Proceedings*, Am. Inst. Elec. Engrs., New York City, $1.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governors Island, New York Harbor, 50c.
(45) *Coal Age*, New York City, 10c.
(46) *Scientific American*, New York City, 15c.
(47) *Mechanical Engineer*, Manchester, England, 3d.
(48) *Zeitschrift*, Verein Deutscher Ingenieure, Berlin, Germany, 1, 60m.
(49) *Zeitschrift für Bauwesen*, Berlin, Germany.
(50) *Stahl und Eisen*, Düsseldorf, Germany.
(51) *Deutsche Bauzeitung*, Berlin, Germany.
(52) *Rigasche Industrie-Zeitung*, Riga, Russia, 25 kop.
(53) *Zeitschrift*, Oesterreichischer Ingenieur und Architekten Vereines, Vienna, Austria, 70h.
(54) *Transactions*, Am. Soc. C. E., New York City, $12.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.

(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $6.
(57) *Colliery Guardian*, London, England, 5d.
(58) *Proceedings*, Engrs.' Soc. W. Pa., 2511 Oliver Bldg., Pittsburgh, Pa., 50c.
(59) *Proceedings*, American Water-Works Assoc., Troy, N. Y.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Drop Forger*, Thaw Bldg., Pittsburgh, Pa., 10c.
(63) *Minutes of Proceedings*, Inst. C. E., London, England.
(64) *Power*, New York City, 5c.
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Gas Journal*, London, England, 6d.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(69) *Der Eisenbau*, Leipzig, Germany.
(71) *Journal*, Iron and Steel Inst., London, England.
(71a) *Carnegie Scholarship Memoirs*, Iron and Steel Inst., London, England.
(72) *American Machinist*, New York City, 15c.
(73) *Electrician*, London, England, 18c.
(74) *Transactions*, Inst. of Min. and Metal., London, England.
(75) *Proceedings*, Inst. of Mech. Engrs., London, England.
(76) *Brick*, Chicago, Ill., 20c.
(77) *Journal*, Inst. Elec. Engrs., London, England, 5s.
(78) *Beton und Eisen*, Vienna, Austria, 1, 50m.
(79) *Forscherarbeiten*, Vienna, Austria.
(80) *Tonindustrie Zeitung*, Berlin, Germany.
(81) *Zeitschrift für Architektur und Ingenieurwesen*, Wiesbaden, Germany.
(83) *Gas Age*, New York City, 15c.
(84) *Le Ciment*, Paris, France.
(85) *Proceedings*, Am. Ry. Eng. Assoc., Chicago, Ill.
(86) *Engineering and Contracting*, Chicago, Ill., 10c.
(87) *Railway Engineering and Maintenance of Way*, Chicago, Ill., 10c.
(88) *Bulletin* of the International Ry. Congress Assoc., Brussels, Belgium.
(89) *Proceedings*, Am. Soc. for Testing Materials, Philadelphia, Pa., $5.
(90) *Transactions*, Inst. of Naval Archts., London, England.
(91) *Transactions*, Soc. Naval Archts. and Marine Engrs., New York City.
(92) *Bulletin*, Soc. d'Encouragement pour l'Industrie Nationale, Paris, France.
(93) *Revue de Métallurgie*, Paris, France, 4 fr. 50.
(95) *International Marine Engineering*, New York City, 20c.
(96) *Canadian Engineer*, Toronto, Ont., Canada, 10c.
(98) *Journal*, Engrs. Soc. Pa., Harrisburg, Pa., 30c.
(99) *Proceedings*, Am. Soc. of Municipal Improvements, New York City, $2.
(100) *Professional Memoirs*, Corps of Engrs., U. S. A., Washington, D. C., 50c.
(101) *Metal Worker*, New York City, 10c.
(102) *Organ für die Fortschritte des Eisenbahnwesens*, Wiesbaden, Germany.
(103) *Mining and Scientific Press*, San Francisco, Cal., 10c.
(104) *The Surveyor and Municipal and County Engineer*, London, England, 6d.
(105) *Metallurgical and Chemical Engineering*, New York City, 25c.
(106) *Transactions*, Inst. of Min. Engrs., London, England, 6s.
(107) *Schweizerische Bauzeitung*, Zürich, Switzerland.
(108) *Southern Machinery*, Atlanta, Ga., 10c.
(109) *Journal*, Boston Soc. C. E., Boston, Mass., 50c.
(110) *Journal*, Am. Concrete Inst., Philadelphia, Pa., 50c.
(111) *Journal of Electricity, Power and Gas*, San Francisco, Cal., 25c.
(112) *Internationale Zeitschrift für Wasser-Versorgung*, Leipzig, Germany.
(113) *Proceedings*, Am. Wood Preservers' Assoc., Baltimore, Md.
(114) *Journal*, Institution of Municipal and County Engineers, London, England, 1s. 6d.
(115) *Journal*, Engrs.' Club of St. Louis, St. Louis, Mo., 35c.
(116) *Blast Furnace and Steel Plant*, Pittsburgh, Pa., 15c.

LIST OF ARTICLES

Bridges.

The 186 Ft. Bascule Bridge of the C. & N. W. Ry., Over the North Branch of the Chicago River at Deering.* O. F. Dalstrom. (4) Sept.
Another Large Railroad Bridge Completed.* (15) Sept. 14.
Economics of Bridge Design. J. A. L. Waddell. (Abstract of lecture before School of Eng., Univ. of Kansas.) (96) Oct. 11.
The James River Bridge.* (19) Oct. 13.
Bridge Spans Moved Endwise to Rest on New Piers.* (13) Oct. 25.
Ponts Flottants sur le Mississippi pour le Passage du Milwaukee and St. Paul Railway.* P. Calfas. (33) Oct. 27.
L'Achèvement du Pont de Québec.* (33) Nov. 17.

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* Illustrated.

Electrical.

Improved Elevating Industrial Truck. (20) Sept. 6.
Means to Economy from Motor Driven Mills.* D. M. Petty. (Abstract of paper read before the Assoc. of Iron and Steel Elec. Engrs.) (20) Sept. 13.
Economic Industrial Applications of Electricity. Norman T. Wilcox. (4) Oct.
Cross-Current Predeterminations from Crank-Effort Diagrams.* Louis Ilmer Milford. (55) Oct.
Central Station Power for Steel Mills.* Joseph McKinley and Roy L. Bauer. (116) Oct.
Modern Hardware Store Lighting.* C. E. Clewell. (108) Oct.
Electric Code: Adopted by the Industrial Board, Pennsylvania Department of Labor and Industry, Operative on and After July 1, 1917. (2) Oct.
Appleton Water-Steam Plant.* Thomas Wilson. (64) Oct. 2.
The Significance of Load Graphs.* Terrell Croft. (64) Oct. 2.
Underground Telephone Cables. George Viard. (Abstract of article in *Annales des Postes, Télégraphes et Teléphones.*) (73) Oct. 5.
Electric Haulage at Delagua Collieries. F. Hoskinson. (57) Oct. 5.
The Commutation of Large Continuous-Current Generators and Rotary Converters Under Heavy Overload Conditions.* H. G. Bell. (Abstract of paper in *Journal* of the Municipal School of Technology.) (73) Oct. 5.
An Approximate Method of Checking the Accuracy of a Direct-Reading Insulation Testing Set.* G. W. Stubbings. (26) Oct. 5.
Improved Method of Testing Current Transformers.* Francis B. Silsbee. (27) Oct. 6.
Mechanical Analogies in Electricity.* Wilson C. Morris. (19) Oct. 6.
Making System Adequate for Increased Loads. P. O. Reyneau. (27) Oct. 6.
Street Lighting for Business Districts.* James R. Cravath. (27) Oct. 6.
Reducing the Peak Load by a Remotely Controlled Water-Works Pumping Unit.* (86) Oct. 10.
The Princep's "Deflector" Air Filter.* (22) Oct. 12.
Ultra-Violet Radiation. Charles A. Schunck. (Abstract of a paper read before the Röntgen Soc.) (19) Oct. 13.
Charging Racks for Miners' Lamp Batteries. (45) Oct. 13.
Some Difficulties with Iron-Wire Transmission.* M. D. Leslie. (27) Oct. 13.
Shimming Field Poles Cures Troubles with Alternator.* E. Hagenlocher. (27) Oct. 13.
Iron-Wire Transmission for Rural Extensions.* L. P. Perry. (27) Oct. 13.
The Electrical Dealer's Profits. A. H. Halloran. (111) Oct. 15.
Radio-Activity and Some Advances in Physical Science. Howard H. Barker. (Paper read before the Teknik Club.) (105) Oct. 15.
Power Plant Calumet Terminal Elevator.* Thomas Wilson. (64) Oct. 16.
Frequency-Changer Sets.* Quentin Graham. (64) Serial beginning Oct. 16.
Open and Enclosed Type Fuses.* A. B. Eason. (73) Oct. 19.
Setting Wood Poles for Seventy Cents Each.* Allan C. Haskell. (17) Oct. 20.
D.-C.-Excited Transformers as Current-Limiting Reactors.* (27) Oct. 20.
Design of Solenoids and Plunger Magnets.* George L. Hedges. (27) Oct. 20.
Rating Artificial Lighting Systems. Davis H. Tuck. (27) Oct. 20.
Disturbance of Telegraphic Communication in the Rhone Valley Through the Operation of the Lötschberg Electric Railway.* M. Dumermuth. (Abstract of an article in *Elektrotechnische Zeitschrift.*) (73) Oct. 26.
The Squirrel Cage Speed Indicator.* E. B. Brown. (73) Oct. 26.
A Technical Specification for Metal Filament Glow Lamps. (Abstract of an article in *Bulletin* of the Association Suisse des Electriciens.) (73) Oct. 26
Internal Relations in Audion-Type Radio Receivers.* Ralph Bown. (Abstract of article in *Physical Review.*) (73) Oct. 26.
Magneto Flash Lamp.* (26) Oct. 26.
Inductive and Electrostatic Troubles Arising from A. C. Railways. (26) Oct. 26.
The Development of the Coherer.* E. C. Green. (From the *General Electric Review.*) (19) Oct. 27.

Marine.

Aviation as Applied to the Navy. George D. Murray. (109) Oct.
Mare Island Navy Yard.* (72) Oct. 11.
United States Standard Twin-Screw Wooden Steamships.* (11) Oct. 12.
Four-Slip Shipyard Compactly Arranged on City Property. (13) Oct. 18.
Les Chalands et Navires en Béton Armé; Construction des Navires *Beton I* et *Namenfjords* à Porsgrund et à Moss (Norvège).* (33) Dec. 1.
Les Nouveaux Navires de Commerce en Acier des États-Unis.* (33) Dec 8.
La Défense du Commerce Maritime Contre les Sous-Marins.* (33) Serial beginning Dec. 15.

Mechanical.

Use of Producer Gas Without Regenerators.* John H. Bartlett, Jr. (20) Aug. 2.
Devices to Facilitate Shell-Machining.* Enos Moore. (20) Aug. 2.
A 12-In. Lathe for Toolroom Work. (20) Aug. 2.

* Illustrated.

Mechanical—(Continued).

The Use and Abuse of Steel for Aircraft.* R. K. Bagnall-Wild and E. W. Birch. (Abstract of paper read before the Institution of Automobile Engrs.) (20) Aug. 9.
Electric Steel for Roller Bearings.* (20) Aug. 9.
New Plant of Pyle-National Company.* (20) Aug. 16.
Lathe for Turning Torpedo Heads.* (20) Aug. 23.
Expansion of the Gier Pressed Steel Co.* Charles Lundberg. (20) Aug. 23.
Gas Fired Welding Furnace.* Charles E. Richardson. (20) Aug. 23.
Recovery of Coke Breeze at Skip Hoists.* (20) Aug. 30.
The Preparation of Rock Products.* Raymond W. Dull. (4) Sept.
Planning Department in Modern Shops. (Abstract of paper read before Providence Eng. Soc.) (20) Sept. 6.
Compressed Coal Gas for Motor Lorries. (104) Sept. 7.
Graphite Lubrication. (20) Sept. 13.
New Air-Carried Powdered Coal Plant.* (20) Sept. 27.
Huge Floating Crane.* (20) Sept. 27.
The Trumble Refining Process (for Oil).* N. W. Thompson. (55) Oct.
The Transfer of Heat Between a Flowing Gas and a Containing Flue.* Lawford H. Fry. (55) Oct.
Plate Mills for Rolling Sheared Plates. F. C. Biggert. (116) Oct.
By-Product Coke Oven Pressure Regulation.* W. Trinks. (116) Oct.
Improving Blast Furnace Blowing Engines.* (116) Oct.
Characteristics of Roller Bearings.* P. B. Liebermann. (116) Oct.
Electric Drives for Reversing Mills.* D. M. Petty. (116) Oct.
Development and Progress in Aviation Engines.* Henry Souther. (3) Oct.
Eliminating Unproductive Time.* Holden A. Evans. (9) Oct.
Utilization of Factory Wastes.* C. B. Auel. (9) Oct.
Devices to Unload Coal from Cars.* Horace Goldstein. (9) Oct.
New Material for Gears.* (9) Oct.
Forging Machine Work at Silvis Shops.* (35) Oct.
Aviation as Applied to the Navy. George D. Murray. (109) Oct.
How to Compute Strength of Boiler Shells in Fuel Oil Practice.* Robert Sibley and Chas. H. Delany. (111) Oct. 1.
Encouraging Modern Methods in Gas Lighting.* (83) Oct. 1.
Gas Mantle Lighting Conditions in the United States. R. S. McBride and C. E. Reinicker. (Abstract of *Technical Paper No. 99.*) (83) Oct. 1.
Present Status and Prospects of Gas Lighting. Wm. J. Serrill. (83) Oct. 1.
Calculating Leakage of Gas in Mains.* (83) Oct. 1.
Test of a Rotary Pump.* (83) Oct. 1.
The Production and Prevention of Naphthalene. Thomas D. Miller. (From the *American Gas Inst. News.*) (66) Serial beginning Oct. 2.
High Speed of Steam Turbines. W. F. Schaphorst. (64) Oct. 2.
Building a Military Training Airplane.* Fred H. Colvin. (72) Oct. 4.
Safety Engineering at the Winchester Repeating Arms Company.* C. B. Hayward. (72) Oct. 4.
Timken Plant for Heat-Treating Axles. (20) Oct. 4.
The Petrol Tractor on the Farm.* (Abstract of a paper read before the Soc. of Agricultural Engrs.) (12) Oct. 5.
Notes on the Present Knowledge and Practice in Regard to the Briquetting of Iron Ores. Guy Barrett and T. B. Rogerson. (12) Oct. 5.
Construction and Working of Boilers in Intensive Service. (22) Oct. 5.
Development of Aviation Engines.* Victor W. Page. (46) Oct. 6.
Aeroplanes in the Making.* (46) Oct. 6.
Ideal Shop for Sharpening Drill Steel.* George H. Gilman. (16) Oct. 6.
Saving of 79.7 Per Cent. in Floor Space But One of Many Advantages Gained by Replacing Oil-Burning Tile-Drying Installation by Gas.* F. H. Mugg. (24) Oct. 6.
Converting Existing Smoke-Houses to Gas.* Gilbert C. Shadwell. (24) Oct. 6.
Test Removes Uncertainty as to Quantity of Air Rotary Pump Will Handle.* (24) Oct. 6.
Can the Yield of Benzol Derivatives Be Improved by Carbonizing Coal at Lower Temperatures? Norton H. Humphrys. (24) Oct. 6.
Drop in Pressure of Compressed-Air Hose.* Walter S. Weeks. (103) Oct. 6.
Modern Clay Testing. Arthur E. Williams. (76) Serial beginning Oct. 9.
Using Hot Gases from Burning Kilns to Dry Clay Ware. (76) Oct. 9.
New Boilers for Ashley Street Station.* John Hunter. (64) Oct. 9.
Operation of Mechanical Stokers.* H. F. Laurence. (64) Oct.9.
Some Experiences with Intermittent Verticals.* Harold H. Collett. (Read before the North of England Gas Managers Assoc.) (66) Oct. 9.
Precision Drilling Machine.* C. E. Davies. (72) Oct. 11.
Possibilities of Rapid Growth in Airplane Work. Fred H. Colvin. (72) Oct. 11:
On the Testing of Refractory Materials.* J. W. Mellor. (Read before the Ceramic Soc.) (11) Oct. 12; (16) Oct. 9; (66) Oct. 9; (22) Oct. 5.
The Use of Culm and Other Waste Fuels.* John C. B. Kershaw. (12) Oct. 12.

* Illustrated.

Mechanical—(Continued).

The Utilization of Undeveloped Fuels in Pulverized Form.* (26) Oct. 12.
Principles and Methods of a New System of Gas-Firing.* A. C. Ionides. (12) Oct. 12.
Suction Gas from South African Coals. F. C. Sturrock and E. T. Way.* (From *Journal* of the South African Institution of Engrs.) (57) Oct. 12.
New Coke Ovens and By-Product Plant at Bearpark Brancepeth Colliery, Durham.* (22) Oct. 12.
Refractories and Modern Kilns. J. G. Maxwell. (Paper read before the Ceramic Soc.) (11) Oct. 12.
On the Refractory Properties of Silica. H. Le Chatelier and B. Bogitch. (Abstract of paper read before the Ceramic Soc.) (11) Oct. 12.
Recovering Sulphur from Coal. (57) Oct. 12.
Time Near at Hand When Practically All of the Country's Coffee Will Be Gas Roasted.* H. E. Danner. (24) Oct. 13.
The Synthetic Making of Sodium Cyanide.* G. H. Clevenger. (103) Oct. 13.
Efficiency and Utilization of Gas in Top Burners.* Charles Norman Cross. (Paper read before Pacific Coast Gas Assoc.) (83) Oct. 15.
Storage, Weathering and Spontaneous Combustion of Coal. (105) Oct. 15.
Fractional Combustion. Wilder D. Bancroft. (Paper read before the Am. Electrochemical Soc.) (105) Oct. 15.
Furnaces in Fuel Oil Practice.* Robert Sibley and Chas. H. Delany. (111) Oct. 15.
Gas-Driven Motor Vehicles. (66) Oct. 16.
Simmance's Total-Heat Recording Calorimeter.* (66) Oct. 16.
How Dull Tools Displace the Grain of Bearing Metals.* Christopher H. Bierbaum. (72) Oct. 18.
Oxyacetylene Repairs.* Charles Shaeff. (72) Oct. 18.
Plant for Large Output of 1918 Castings.* (20) Oct. 18.
Sub-Committee on Coal-Tar By-Products Issues Condensed Report on Recovery of Toluol from Gas Works.* (24) Oct. 20.
Some Troubles of Steam Turbines. Eugene Bak. (64) Oct. 23.
Notes on the Flow of Clay Through Hollow Ware Dies.* George D. Morris. (Reprinted from *Transactions* of the Am. Ceramic Soc.) (76) Oct. 23.
Using Instruments in Dryer Regulation.* (76) Oct. 23.
A Study of Velocity Diagrams for Shapers and Slotters.* A. Lewis Jenkins. (72) Serial beginning Oct. 25.
An Outfit for Making Painted Roll Tin.* (101) Oct. 26.
Working Costs of Prime Movers.* Oswald Wans. (57) Oct. 26; (26) Oct. 26.
Importance of Flexibility of Boiler Control. Victor B. Phillips. (27) Oct. 20.
Pulverized Fuel in Brazil.* (18) Oct. 27.
The Measurement of High Temperatures. Henry Le Chatelier. (19) Oct. 27.
Gas Displaces Oil as Industrial Fuel in Western Tractor Factory.* Harry L. Wolff. (24) Oct. 27.
Effect on Consuming Devices of Mixed Artificial and Natural Gas. Frank S. Honberger. (24) Oct. 27.
The Gas Appliance Testing Laboratory.* H. M. Riley and L. B. Wilson, Jr. (24) Serial beginning Oct. 27.
Recent Progress in Internal-Combustion Engine Valve Gears.* R. E. Mathot. (64) Oct. 30.
Les Tracteurs aux Essais de Noisy-le-Grand.* (92) Sept.
Récupération des Potasses Existant dans les Poussières des Fabriques de Ciments et dans Celles des Hauts Fourneaux. (92) Sept.
Trois Ans d'Expériences sur l'Aéroplane. J. Legrand. (92) Sept.
L'Utilisation Rationnelle du Charbon en Allemagne, et la Gazéification Complète des Combustibles Solides. René Schmutz. (33) Nov. 3.
La Consommation et la Production du Sel. Nicolas Flamel. (33) Serial beginning Nov. 17.
Die Stützung von Dampfkesseln und von Wasserleitungen.* E. Höhn. (107) Nov. 3.
Die Verwendung von Holz und Torf in den Gaswerken. E. Ott. (107) Nov. 24.

Metallurgical.

Grinding as a Substitute for Milling.* (20) Aug. 2.
Manganese in Steel Making. Henry M. Howe. (Abstract of paper presented before Am. Soc. for Testing Materials.) (20) Aug. 2.
The Role of Chrome Vanadium in Steel. F. J. Griffiths. (Abstract of paper read before Am. Soc. for Testing Materials.) (20) Aug. 2.
Castings that Withstand High Temperatures.* (20) Aug. 2.
Refractories in the Steel Industry. Cosmo Johns. (Abstract of paper read before the Iron and Steel Inst.) (20) Aug. 2.
Rôle of Silicon in Steel Making. W. E. Ruder. (Abstract of paper read before Am. Soc. for Testing Materials.) (20) Aug. 9.
Modern Economies in Pickling Steel. J. H. Snyder. (20) Aug. 9.

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Metallurgical—(Continued).

A New Thermostatic Metal.* (20) Aug. 9.
High Grade Pig Iron from Scrap Steel.* Edwin F. Cone. (20) Aug. 30.
Results of Rolling from Green Ingots.* George W. Dress. (20) Sept. 6.
The Rôle of Nickel in Making Steel. R. R. Abbott. (Abstract of paper read before Am. Soc. for Testing Materials.) (20) Sept. 13.
Structure of Iron Cast in Metal Molds.* Edwin F. Cone. (20) Sept. 20.
Electric Oven Used for Baking Cores.* (20) Sept. 20.
The Metallurgy of Titanium. Robert J. Anderson. (3) Oct.
Magnetic Analysis of Rails and Other Steel Products. Charles W. Burrows. (Abstract of a paper read before Am. Soc. for Testing Materials.) (21) Oct.
Crystallization of Steel Ingots.* J. F. Keller. (116) Oct.
Greaves-Etchells Electric Furnace.* Alfred M. Staehle. (116) Oct.
Improving Blast Furnace Blowing Engines.* (116) Oct.
Operation of Heroult Electric Furnaces.* Walter C. Kennedy. (116) Oct.
On the Superheating of Slags and Metals During Refining, Smelting and Alloying Operations.* J. E. Fletcher. (Paper read before the Soc. of Chemical Industry.) (105) Oct. 1.
Hardening Carbon and Special Steels. L. Grenet. (Abstract of paper read before Iron and Steel Inst.) (20) Oct. 4.
The Acid Open-Hearth Process.* F. Rogers. (Paper read before the Iron and Steel Inst.) (11) Oct. 5.
Foundry Costs. F. T. Clapham. (12) Oct. 5.
The Effect of Great Hydrostatic Pressure on the Physical Properties of Metals. Zay Jeffries. (Paper read before the Inst. of Metals.) (11) Oct. 5.
Investigation Upon a Cast of Acid Open-Hearth Steel.* T. D. Morgans and F. Rogers. (Paper read before the Iron and Steel Inst.) (11) Oct. 5; (20) Oct. 18.
Present Milling Practice of the Joplin District.* Temple Chapman. (16) Oct. 6.
Heat Treatment of Metals. W. A. Ehlers. (19) Oct. 6.
Economical Generation and Use of Electric Power in the Steel Industry. Brent Wiley. (Abstract of paper read before the Assoc. of Iron and Steel Elec. Engrs. (64) Oct. 9.
Economical Production of Small Cores.* R. E. Kennedy. (Abstract of paper read before the Am. Foundrymen's Assoc.) (20) Oct. 11.
Fuel Economy Possibilities in Brass Melting Furnaces.* L. C. Harvey. (Read before the Inst. of Metals.) (11) Oct. 12; (66) Oct. 2.
Chemicals Used in Flotation. O. C. Ralston and L. D. Yundt. (103) Oct. 13.
Hazards of Low Voltage Mill Machinery. C. A. Lauffer. (Abstract of paper read before National Safety Council.) (105) Oct. 15.
Hazards of Low Voltage Mill Machinery. C. A. Lauffer. (Abstract of paper read before National Safety Council.) (105) Oct. 15.
The Treatment of Metallurgical Smoke in Japan. Tetsurow Komakine. (105) Oct. 15.
Physico-Chemical Properties of Chrome-Nickel Steels.* Herbert J. French. (105) Oct. 15.
Steel Castings for Ordnance Construction. C. M. Wesson. (Abstract of paper read before Foundrymen's Convention.) (72) Oct. 18.
Effect of Pickling on the Strength of Steel. John Coulson. (Abstract of paper read before Am. Electro-Chemical Soc.) (20) Oct. 18.
Flotation of Lead and Zinc in the Joplin District. C. A. Wright. (103) Oct. 20.
The Electric Furnace for Non-Ferrous Metallurgy.* (27) Oct. 27.
Recovery of Converter-Fumes at Tooele, Utah.* L. S. Austin. (103) Oct. 27.
Preferential Flotation. W. Shallshear. (103) Oct. 27.
L'Industrie et les Grandes Applications de l'Aluminium Pur et à l'Etat d'Alliages.* Jean Escard. (33) Serial beginning Dec. 1.

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Devices to Facilitate Shell-Machining.* Enos Moore. (20) Aug. 2.
Compressed Coal Gas for Motor Lorries. (104) Sept. 7.
Industrial Specialization for a Fighting Army. G. P. Capart. (9) Oct.
Investigation of Defective Small-Arms Ammunition at Washington. (105) Oct. 1.
Construction Was Speedy at Camp Lewis: Largest of the National Army Cantonments at American Lake, Washington, Accommodating 48 000 Men, Finished in 56 Days.* Nathan A. Bowers. (13) Oct. 4.
Building a Military Training Airplane.* Fred H. Colvin. (72) Oct. 4.
Safety Engineering at the Winchester Repeating Arms Company.* C. B. Hayward. (72) Oct. 4.
Equipment of Our New Soldier Factories.* (101) Oct. 5.
Development of Aviation Engines.* Victor W. Page. (46) Oct. 6.
The Classification of Military Aeroplanes.* Bertram W. Williams. (46) Oct. 6.
Government Cost Plus Contracts for Emergency Building. John M. Goodell. (13) Oct. 11.
Steel Castings for Ordnance Construction. C. M. Wesson. (Abstract of paper read before Foundrymen's Convention.) (72) Oct. 18.

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Cast-Iron Shells in Permanent Molds.* Edgar A. Custer. (Paper read before Am. Foundry Assoc.) (72) Oct. 25.
Equipment of a Southern Army Cantonment.* O. Val Serviss. (101) Oct. 26.
Ventilating and Heating Soldiers' Barracks.* (101) Oct. 26.
The New War Truck.* C. H. Hardy. (46) Oct. 27.
Les Modèles Actuels de Torpilles Automobiles.* Stroh. (33) Dec. 8.

Mining.

The Shortage of the Supply of Non-Phosphoric Iron Ore.* William George Fearnsides. (29) Sept. 28.
Plant of the Columbia Quarry Company.* (67) Oct.
Electric Haulage at Delagua Collieries.* F. Hoskinson. (57) Oct. 5.
Underground Mine Sanitation. A. J. Lanza. (Abstract of paper read before the National Safety Council.) (16) Oct. 6.
Uses of Concrete in Coal Mines.* (45) Oct. 6.
Electric Winding.* D. Burns. (Paper read before the West of Scotland Branch joint meeting of the National Assoc. of Colliery Managers and Mining Inst. of Scotland.) (73) Oct. 12.
Ferro-Concrete Pit Props.* W. Marriott. (Paper read before Midland Counties Institution of Engrs.) (57) Oct. 12; (22) Oct. 12.
Equipment and Organization of Mine Rescue Stations.* A. J. Moorshead. (Paper read before National Safety Congress.) (45) Oct. 13.
Accident Statistics and the Operator. Albert H. Fay. (Abstract of paper read before the Min. Section of the National Safety Council.) (45) Oct. 13.
Charging Racks for Miners' Lamp Batteries.* (45) Oct. 13.
Alaska Juneau 1520-Ft. Raise.* C. K. White. (16) Oct. 13.
The Granby Mine at Anyox, B. C.* Wakely A. Williams. (16) Serial beginning Oct. 13.
Safety and Sociological Conditions in Utah.* R. M. Magraw. (45) Oct. 13.
Equipment Repairs in a Gold and Silver Mine.* (72) Oct. 18.
The Government Mine Rescue Cars.* D. J. Parker. (Paper read before the National Safety Council.) (45) Oct. 20.
Making Coal Cars in Mines Safe.* Carl Scholz. (Paper read before National Safety Council.) (45) Oct. 20.
Mechanical Ventilation for Metal Mines. George Rice. (103) Oct. 20.
Safe Compressive Stresses on Colliery Brickwork. W. C. Popplewell. (57) Oct. 26.
Pillar Extraction in Thick Seams.* R. W. Magraw. (45) Oct. 27.
Skip-Changing Devices at the Butte Mines.* Theodore Pilger. (103) Oct. 27.
Power Plant of the St. Joseph Lead Co.* E. L. Broome. (64) Oct. 30.
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Managing Alien Workers in War Time. Winthrop Talbot. (20) Aug. 2.
The Illiterate Worker in War Time. Winthrop Talbot. (20) Aug. 16.
The Alien and the Industrial Worker.* Winthrop Talbot. (20) Aug. 23.
Cost of Health Supervision of Employees. (20) Aug. 30.
Storage of Tar. G. F. Dunn. (Abstract of paper read before South-West of England Assoc. of Gas Managers.) (104) Sept. 14.
Practical Welfare Work in Foundries.* S. W. Ashe. (Abstract of paper read before National Safety Council.) (20) Sept. 20.
A Study of Surface Resistance With Glass as the Transmission Medium.* H. R. Hammond and C. W. Holmberg. (55) Oct.
American Research Methods. Charles H. McDowell. (4) Oct.
Relation of the Appraisal to Industrial Management. Charles W. McKay. (9) Oct.
Athletics for the Working Force.* C. B. Lord. (9) Oct.
Recreation of the Working Force.* Mary Barnett Gilson. (9) Oct.
Health of the Working Force. Otto P. Geier. (9) Oct.
Practical Aspects of the Safety Movement. Arthur H. Young. (9) Oct.
Obsolescence as an Element Affecting Rates. C. E. Grunsky. (111) Oct. 1.
Packing and Plant Handling of Hazardous Chemicals. N. A. Lowry. (Paper read before the National Safety Council.) (105) Oct. 1.
Getting Potash Kelp With a Submarine Lawn Mower is a War Industry.* (72) Oct. 4.
The Fixation of Atmospheric Nitrogen. (26) Serial beginning Oct. 12.
A Further Three Years' Flying Experience. B. C. Hucks. (Abstract of a paper read before the Aeronautical Soc.) (29) Oct. 19.
Further Notes on a High-Temperature Thermostat.* J. L. Houghton and D. Hanson. (Abstract of paper read before the Inst. of Metals.) (73) Oct. 19.
Specially Ruled Sheets Have Wide Use in Drafting Room. Richard T. Dana. (13) Oct. 25.
Le Congrès des Ingénieurs à l'Exposition de San-Francisco et l'Achèvement du Canal de Panama. L. de Pulligny. (32) May.

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Miscellaneous—(Continued).

Tables de Division.* H. Chevalier. (32) May.
La Formation des Ingénieurs au Japon. H. Chevalier. (32) May.
Les Sourds et les Muets de la Guerre.* Lucien Fournier. (33) Nov. 3.
Formule de Prime à la Production pour le Paiement des Salaires. Louis de Contenson. (33) Dec. 1.
La Préparation de l'Acide Acétique. A. Mailhe. (33) Dec. 22.
Von der Cykloide.* A. Kiefer. (107) Dec. 8.

Municipal.

Is State Subsidy for Housing Desirable? If So, on What Principle? Bailie A. W. Paton. (Abstract of paper read before the Incorporated Sanitary Assoc. of Scotland.) (104) Sept. 14.
Housing the Worker and His Family. Peter Fyfe. (Abstract of paper read before the Incorporated Sanitary Assoc. of Scotland.) (104) Sept. 14.
Tenements as Against Cottages in City Areas. James Thomson. (Abstract of paper read before Incorporated Sanitary Assoc. of Scotland.) (144) Sept. 14.
Government Housing Scheme, Well Hall, Kent.* (104) Sept. 28.
Remodelling of Civic Asphalt Plant, Ottawa.* L. McLaren Hunter. (96) Oct. 25.
Wettbewerb zu einen Ueberbauungsplan der Gemeinde Zofingen.* (107) Nov. 17.

Railroads.

Survey Methods Used on the Wilson Avenue Tunnel, Chicago, Ill.* H. W. Clausen. (4) Sept.
Wooding's Automatic Train-Stop.* (15) Sept. 14.
Large Capacity Tank Cars for the Santa Fé. (15) Sept. 14; (25) Oct.
Progress in Accident Prevention. Marcus A. Dow. (Abstract of address before National Safety Council.) (15) Sept. 14.
Salvaging Rolling Stock on the Santa Fé. (15) Sept. 14.
Federal Inspection Requirements.* (Abstract of a report published by General Foremen's Assoc.) (25) Oct.
Boiler Shop Apprenticeship Methods. (25) Oct.
Unique Underframe Reinforcement.* (25) Oct.
Freight Car Maintenance.* Lewis K. Sillcox. (25) Oct.
Magnetic Analysis of Rails and Other Steel Products. Charles W. Burrows. (Abstract of a paper read before Am. Soc. for Testing Materials.) (21) Oct.
Forging Machine Work at Silvis Shops.* (25) Oct.
Freight Car Maintenance.* Lewis K. Sillcox. (25) Oct.
The Economies of Car Design. John A. Pilcher. (25) Oct.
Steel Car Shop of the E. J. & E.* (25) Oct.
Cross Balance of Locomotives.* C. H. Faris. (25) Oct.
Height of Firedoors.* (25) Oct.
Firebox Temperature Experiments.* (25) Oct.
Preliminary Locomotive Design.* W. R. Maurer. (25) Oct.
Russian Decapod Locomotives.* (25) Oct.; (13) Oct. 12.
Standardization and Improved Locomotive Service. George Armstrong. (25) Oct.
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The Conservation of Material.* M. K. Barnum. (Paper read before N. Y. R. R. Club.) (65) Oct.
Wheel Work and Other R. R. Shop Operations.* Frank A. Stanley. (72) Oct. 4.
Steel Tower Carries Clock and Water Tank.* (13) Oct. 4.
The Government Position on Valuation. C. A. Prouty. (15) Oct. 5.
New Locomotive on the South-Eastern and Chatham Railway.* (12) Oct. 5.
New P. R. R. Locomotive Has Powerful Electrical Equipment. (17) Oct. 6.
Steel Supply Cars, Norfolk & Western Railway.* (18) Oct. 6.
The Effect of the Brick Arch on Locomotive Smoke Abatement. J. T. Anthony. (Abstract of paper read before Smoke Prevention Assoc.) (18) Oct. 6.
Making an Electric Locomotive Engineer Out of a Steam Locomotive Engineer. W. F. Coors. (18) Oct. 6.
Some Present-Day Problems in Railway Maintenance Work. F. B. Tapley. (Abstract of paper read before the Canadian Ry. Club.) (96) Oct. 11.
Making the Valuation Records Permanent. James G. Wishart. (13) Oct. 11.
Boiler Work in a Nevada Railroad Shop.* Frank A. Stanley. (72) Oct. 11.
The Virginian Railway.* (12) Oct. 12.
Dragline Used Successfully in Track Depression.* (15) Oct. 12.
Electrically-Operated Locomotive Turntable.* (11) Oct. 12.
Power Plant Supervision on the Baltimore & Ohio.* (15) Oct. 12.
The Progress of the Japanese Railroads.* Sukehiko Goto. (15) Oct. 12.
Split Head and Internal Stresses in Rails.* (18) Oct. 13.
Cause and Prevention of Astray Freight. J. J. Quirk. (18) Oct. 13.
The Self-Contained Railway Motor Car.* Raymond S. Zeitler. (18) Oct. 13.
Locomotive Frame Work.* Frank A. Stanley. (72) Oct. 18.
Three Electricians for Twenty-eight 2400-Volt D. C. Locomotives.* 17), Oct. 20.
Locomotive Design and Construction from the Maintenance Standpoint. W. H. Winterrowd. (Paper read before Canadian Ry. Club.) (18) Oct. 20.

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Inspection of Rails During Manufacture. C. W. Gennet, Jr. (Abstract of paper read before Roadmasters' and Maintenance of Way Assoc.) (18) Oct. 20.
Housing and Feeding Bridge and Building Crews.* F. E. Weiss. (Abstract of paper read before Am. Ry. Bridge and Building Assoc.) (18) Oct. 20.
Gasoline Motive Power on Far Western Railways.* (17) Oct. 20.
A Railroad Blacksmith Shop.* Frank A. Stanley. (72) Oct. 25.
Disturbance of Telegraphic Communication in the Rhone Valley Through the Operation of the Lötschberg Electric Railway.* M. Dumermuth. (Abstract of an article in *Elektrotechnische Zeitschrift.*) (73) Oct. 26.
Why a Railway Should Equip with Block Signals and Interlocking. Henry M. Sperry. (18) Oct. 27.
Les Chemins de Fer aux Etats-Unis, Impressions Recueillies au Cours d'une Visite.* J. Carlier. (33) Serial beginning Nov. 3.
Tour "Pond" pour la Tournage des Roues de Wagons Calées sur leurs Essieux.* (33) Nov. 24.
Nouvelles Locomotives du South Eastern and Chatham Railway (Angleterre).* (33) Dec. 29.
Les Chemins de Fer à Faible Trafic des Grands Réseaux après la Guerre; Réduction du Nombre des Employés et des Dépenses d'Exploitation. Claise. (33) Dec. 29.
Groupes Electrogènes pour l'Eclairage et le Démarrage des Voitures Automobiles.* (33) Dec. 29.
Compagnie des Chemins de fer du Midi: Le Conducteur de Retour du Courant Alternatif de Traction. (33) Dec. 29.
Geologische und hydrologische Beobachtungen über den Mont d'Or-Tunnel und dessen anschliessende Gebiete.* H. Schardt. (107) Serial beginning Dec. 8.
Präzisions-Nivellement durch den Gotthardtunnel 15./21. Juli, 1917. H. Zölly. (107) Dec. 8.
Ueber die Verwendbarkeit eiserner Fahrleitungen für Wechselstrombahnen.* W. Kummer. (107) Dec. 22.

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Union of South Africa Municipal Electrical Undertakings. E. Poole. (Abstract of paper read before the Engr. Section of the Natal Soc. for the Advancement of Science and Art.) (26) Serial beginning Oct. 5.
Laying Concrete Track Base Without Storing Materials on Streets.* Edward A. West. (17) Oct. 6.
Re-Engineering an Interurban Line.* (17) Oct. 6.
How Some Difficult Special Work Repair Jobs Were Accomplished.* W. L. Whitlock. (17) Oct. 13.
Boston Substation Built Between Subway and Surface Tracks.* (17) Oct. 27.
Denver's New Storage Yard Served by a Single 100-Ft. Derrick.* Edward A. West. (17) Oct. 27.
Do Changing Conditions Favor Constant-Speed Railway Motors?* R. E. Hellmund. (17) Oct. 27.

Roads and Pavements.

The Effect of Modern Traffic Upon Urban Roads and Tramway Tracks. E. W. Cockerlyne. (104) Sept. 28.
The Recent Revision of Ideas About Brick Pavement Construction. (60) Oct.
Present Practice in the Construction of Brick Pavements in Chicago. H. J. Fixmer. (60) Oct.
Sheet Asphalt for Country Roads.* E. A. Trego. (86) Oct. 3.
Roller Method of Finishing Concrete Roads as Used by Vermilion County, Illinois.* P. C. McArdle. (86) Oct. 3; (13) Oct. 4.
Instructions of Kentucky Department of Public Roads for Making Road Surveys and Estimates. (86) Oct. 3.
La Salle's Concrete Causeway Has Become Popular.* H. K. Higgins. (13) Oct. 4.
Clinker Asphaltic Macadam, Hounslow. J. G. Carey. (04) Oct. 5.
Grouted Granite Block Laid Under Congested Traffic Conditions.* (13) Oct. 11.
Stone-Gravel Road Proves Its Usefulness in Michigan. Donald A. Thomas. (13) Oct. 11.

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Intercepting Sewer Construction in the Northern Part of the Sanitary District of Chicago.* H. R. Abbott. (4) June.
The Collection and Disposal of Refuse and Nightsoil in Singapore. W. K. Symonds. (104) Sept. 7.
Construction Plant and Methods Employed in Building the Woodville Avenue Sewer, Toronto, Ont.* (60) Oct.
Toronto Incinerator Exceeds Burning Capacity Guarantee by 133 Per Cent. (60) Oct.

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Various Methods of Dewatering Activated Sludge. Edward Bartow. (60) Oct.
Hygienic and Sanitary Equipment. John Roach. (9) Oct.
Spokane's Steam Heating System.* (111) Oct. 1.
Richmond Constructs Immense Combined Sewer.* Charles E. Bolling. (13) Oct. 4.
Two Toronto Sewers Built on Piles and Timber Bents.* W. G. Cameron. (96) Oct. 4.
Possibilities of the Vacuum Heating System.* Harold L. Alt. (101) Serial beginning Oct. 5.
Equipment of Our New Soldier Factories.* (101) Oct. 5.
Public Abattoirs. R. L. Honey. (Abstract of paper read before Royal Sanitary Inst.) (104) Oct. 5.
Hot-Water Heating Under Forced Circulation.* Charles D. Allan. (64) Serial beginning Oct. 9.
Estimating for Plumbers and Steam Fitters.* Wesley A. Fink. (101) Oct. 12.
Further Notes on a High Temperature Thermostat.* J. L. Haughton and O. Hanson. (Abstract of Article in *Journal* of the Inst. of Metals.) (12) Oct. 12.
Four Gas-Fired Furnaces for House Heating Installed for Every Furnace Using other Fuel in Los Angeles. M. L. Neely. (Abstract of paper read before the Pacific Coast Gas Assoc.) (24) Oct. 13.
To Meet State Laws Austin Proposes Thoroughgoing Sewage Works.* John H. Gregory. (13) Oct. 18.
Comparative Tests of Air Diffusers and Devices for Dewatering Activated Sludge. Edward Bartow. (Abstract of paper read before Am. Inst. of Chemical Engrs.) (96) Oct. 18.
Standardizing Cast-Iron Soil Pipe and Fittings.* Harry Y. Carson. (101) Oct. 19.
Hot Water Generators and Their Application. (101) Oct. 19.
Notes on Activated Sludge with Particular Reference to the Treatment of Packing-house Wastes. Langdon Pearse. (Abstract of paper read before the Am. Public Health Assoc.) (96) Oct. 25; (13) Oct. 25.
Equipment of a Southern Army Cantonment.* O. Val Serviss. (101) Oct. 26.
Ventilating and Heating Soldiers' Barracks.* (101) Oct. 26.
Anwendung der elektrischen Heizung für industrielle Zwecke.* F. Rulgers. (107) Nov. 24.

Structural.

The Method of the Ellipse of Elasticity and Its Application to Continuous Arches on Elastic Piers.* S. Moreell, Jr. (4) June.
Transverse Tests and Steel Structures.* Geo. W. Dress. (20) Aug. 2.
Sand-Blast Operation.* David Evans. (20) Sept. 20.
Foundry Built for Economical Production.* (20) Sept. 20.
Minimizing Lost Motion in Foundry.* (20) Sept. 27.
Effect of Fire on the Flat Slab Building of the Quaker Oats Co., Petersboro, Ont., Dec. 11, 1916.* T. D. Myirea. (4) Oct.
Eastriggs: An Industrial Town Built by the British Government.* (6) Oct.
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How the Progress of a Big Construction Job Was Scheduled. (67) Oct.
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Computation for Concrete Slabs in Textile Mill Design.* (67) Oct.
Diagrams for Continuous Beams of Unequal Spans.* Frank S. Bailey. (109) Oct.
Atlanta Warehouse Plans Were Changed to Increase Storage.* (13) Oct. 4.
Economical Proportions for Portland Cement Mortars and Concretes.* J. A. Kitts. (96) Oct. 4.
Sheet Metal Work on a City Store Building.* Ernst Eberhard. (101) Oct. 5.
Monolithic Brick Slab for Dryer Roof.* Harlan H. Edwards. (76) Oct. 9.
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Predict Labor Demand Before Job is Started.* Dan Patch. (13) Oct. 11.
Pattern for a Flat Back Fitting.* W. N. (101) Oct. 12.
Tornado Effects on Structures in Three Recent Storms.* S. H. Ingberg. (13) Oct. 18.
Design of Small Mine Hospitals.* O. L. Puckett and J. B. DeHart. (Paper read before Canadian Min. Inst.) (45) Oct. 13.
Power Plant Calumet Terminal Elevator.* Thomas Wilson. (64) Oct. 16.
Comparisons of Various By-Laws Covering Flat Slab Concrete Buildings, with Actual Tests.* W. W. Pearse. (96) Oct. 18.
May Higher Shear Values Be Used In Concrete Design? W. P. Anderson. (13) Oct. 18.
Plant for Large Output of Die Castings.* (20) Oct. 18.
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New Concrete Dwellings near Pittsburgh.* (45) Oct. 20.
Hollow Tile Walls of the Ancients.* Harold V. Walsh. (76) Oct. 23.
Corrosion in Refrigerating Plants. M. A. Saller. (64) Oct. 23.
Largest Concrete Building now Under Construction at St. Louis.* W. J. Knight. (13) Oct. 25.

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Houses for Mine Villages.* A. F. Huebner. (45) Oct. 27.
Proportioning Chimney on Fuel Basis. Henry Misostow. (Abstract of paper read before Smoke Prevention Assoc.) (64) Oct. 30.

Topographical

Use of Mean Sea Level as the Datum for Elevations. E. Lester Jones. (Abstract of *Special Publication No. 41*, U. S. Coast and Geodetic Survey.) (2) Oct.
Notes Upon Survey and Investigation of St. Lawrence River Rapids.* Albert B. Cudebec. (36) Oct.

Water Supply.

Water Supply at Hastings. G. F. Miller. (Abstract of paper read before the Institution of Municipal and County Engrs.) (104) Sept. 14.
Official Duty Tests of Steam Turbine Driven Centrifugal Pumps at Sixty-eight Street Pumping Station, Chicago. (60) Oct.
New Advances in Water Right Adjudication. A. E. Chandler. (111) Oct. 1.
Year Saved by Using Excavated Rock to Line Tunnel.* (13) Oct. 4.
Pipe Staves Creosoted Without Loss of Strength.* O. P. M. Goss. (13) Oct. 4.
Purposes Should Govern Water-Works Valuations.* J. W. Ledoux. (13) Oct. 4; (96) Oct. 18; (2) Oct.
Multiple Arch Dam Design.* L. Jorgensen. (96) Oct. 4.
Features of Hiram Falls (Me.) Development.* (27) Oct. 6.
Reducing the Peak Load by a Remotely Controlled Water-Works Pumping Unit.* (86) Oct. 10.
Methods and Cost of Constructing a 48-In. Submerged River Crossing at Minneapolis, Minn. (86) Oct. 10.
Method and Cost of Rebuilding Filter Beds at Cincinnati Filtration Plant. (86) Oct. 10.
Methods Used at Cincinnati Filtration Plant for Isolating and Identifying Bacillus Coli.* (86) Oct. 10.
Reasonable Limits of Accuracy for Valuation of Water Utility Properties. Allen F. Brewer. (86) Oct. 10.
Effect of Mouthpieces on Flow of Water Through Submerged Short Pipe. (86) Oct. 10.
Electrolysis in Underground Water Pipes. Jos. W. Ivy. (Abstract of paper read before the South-Western Waterworks Assoc.) (96) Oct. 11.
South Falls and Cobden Hydro-Electric Plants.* (96) Oct. 11.
Some Notes on Deficiencies in Water Accounts. Charles G. Henzell. (Abstract of paper read before Municipal Waterworks Assoc.) (104) Oct. 12.
Silver Lake-Los Angeles Aqueduct Decision. J. Henshaw. (111) Oct. 15.
Work of Remodeling Old Hydro-Electric Plant.* (27) Oct. 20.
Meeting New York's Insatiable Demand for Water.* (46) Oct. 27.
Les Installations du Service d'Eau Potable de la Ville de Bangkok (Siam).* L. Robert de la Mahotiére. (33) Nov. 10.
Calcul d'une Conduite en Béton Armé.* L. Robert de la Mahotiére. (33) Dec. 22.
Die Wasserkraftanlagen Tremp und Seros der Barcelona Traction, Light & Power Co.* A. Huguenin. (107) Serial beginning Nov. 10.
Extreme Schnelläuferturbinen.* W. Zuppinger. (107) Dec. 1.

Waterways.

St. Paul-Minneapolis Dam and Locks are Now Completed.* (13) Oct. 4.
St. Maurice River—Control Works are Nearing Completion.* (13) Oct. 25.
Les Ports Français et la Guerre; Situation d'Ensemble et Conclusions Générales. Auguste Pawlowski. (33) Nov. 24.
Les Projets d'Extension du Port du Havre.* A. Dumas. (33) Dec. 22.
Die Schlüberführung der S. B. B. beim Umbau der linksufrigen Zurichseebahn.* (107) Nov. 3.

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